The Engineering and Mining Journal

WITH WHICH IS CONSOLIDATED "MINING AND METALLURGY."

VOL. LXXIII. NEW YORK, SATURDAY, May 10, 1902. No. 19.

THE ENGINEERING AND MINING JOURNAL
(Incorporated.)
261 BROADWAY, NEW YORK.

TELEPHONE. 6866 CORTLANDT. P. O. BOX, 1833.
CABLE ADDRESS "ENGMINJOUR" N. Y."

W. J. JOHNSTON, President. F. J. PRATT, Treasurer.
LUCIUS S. BIGELOW, Vice-Prest., and Gen'l Mgr.

CHICAGO (Telephone, Harrison 3326) 520 Monadnock Building
DENVER . . . . . 206 Boston Building
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LONDON, ENG. . . . . 20 Bucklersbury, 368

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English Subscriptions Payable at London Office, £1 8s 9d

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THE FIRST direct damage to the property of a British mining company in South Africa by the Boers in the field since that to the Natal coal mines early in the war is reported this week. An attack has been made on the copper mines at O'okiep and the railroad from the mines to the shipping port has been partially destroyed. The O'okiep mines are owned by the Cape Copper Company, and are not in the Transvaal or the Orange Free State, but in the northwestern part of Cape Colony. The exact extent of the damage is not known, but the railroad seems to have suffered more than the mines themselves. It is one of the remarkable features of the South African war that the gold mines of the Transvaal should have received so little injury during the Boer control of the Witwatersrand.

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THE LONG contest over the Jones mixer patent has apparently been ended by the recent decision of the United States Supreme Court. The court sustains the validity of the patent for a molten metal carrier and mixer, granted to Captain William R. Jones, which patent was later assigned to the Carnegie Steel Company. The court remands the case to the district court, with directions that an injunction shall be issued restraining the Cambria Steel Company from using the mixer, which is held to be an infringement of the Jones patent. It is to be noted that the court decided this case by a majority of one, Chief Justice Fuller and Justices White, Brewer and Harlan dissenting.

The Jones mixer patent was for the use of a mixer in which molten metal from different furnaces could be mixed and held in reserve to supply steel converters. Some device of this kind is essential in the continuous process of steel making, in which pig iron taken direct from the blast furnace is converted into steel without reheating.

It is not altogether clear from the report of the decision whether the patent is held to cover all forms of mixer, or whether the infringement is of some special feature of the device. The publication of the full decision will be necessary to determine this point.

⚒

WE OBSERVE in several of our esteemed contemporaries a good many statements as to the cost of producing copper which will not bear investigation. For instance, one widely circulated journal makes the absolute statement that the cost of making copper has gone up at least 2 cents a pound within the last year, and similar announcements are quite frequent. Now it is quite possible that there may have been cases of individual mines where the cost of producing copper has increased as much as this, but, if it should be true in certain cases, it would not by any means establish a general average advance. As we have frequently remarked, nothing is more difficult than to give an average cost of production of any metal, be it copper, silver or gold; everything depends upon the circumstances in each individual case, and it would be almost as reasonable to say that the cost of production has gone down as to insist that it has gone up by any fixed amount.

The only thing that can be said with safety is that there has been a general increase in prices of materials and supplies, which would tend to increase the cost of production in a corresponding ratio. In some cases this may be emphasized, and in others offset by conditions peculiar to the mines, and sweeping assertions are only proof of ignorance of the real facts.

⚒

IT IS reported that a company has been organized in London for the purpose of exploiting the iron ore deposits of Dunderland on the west coast of Norway. A "new" process is to be employed, so it is said, for the concentration of the ore which on account of its low-grade has not hitherto been considering a commercial proposition. It is furthermore claimed that this enterprise, capitalized at $10,000,000, will make British ironmasters independent of America for their supply of raw material, as "the Dunderland deposits are capable of supplying England with all the ore she can require for a hundred years to come." This is, of course, interesting information. The "new" process is said to be of the simplest character, the principal feature being a powerful magnet which deflects the iron in the crushed ore as it falls from a chute in front of the magnet.

We do not feel that the iron-ore interests of America have any serious cause for alarm. There are some extensive magnetic concentrating works in New Jersey which, report says, cost in the neighborhood of $2,000,000, and which were to concentrate the enormous bodies of lean ore and sands of that State and make Eastern ironmasters independent of Lake Superior or foreign ores. We do not know of any blast furnace running on these ores, and we have yet to learn of any that has done so, although the works were begun in 1889, and have been remodeled several times. Still, that is no reason why our English friends should not experiment a little.

⚒

MARKET CONDITIONS.

The iron and steel markets are somewhat quieter than they have been, chiefly for the reason that all available material for this year has been covered by contracts, and that many producers have no free material to sell. The demand is unchecked, however, and belated buyers are offering premiums of various amounts for the material which they need. Very little re-selling is reported, and there is little or no evidence of any speculative contracting or holding of pig iron or steel billets. Both are in demand, and it is understood that negotiations are in progress for some large lots of German billets. It is believed that, in view of the present condition of trade abroad, German makers will consent to concessions in price, which will enable buyers to put in billets at Eastern mills at a price not exceeding that of steel from Pittsburg.

As to current prices, there is a good deal of talk about advances. Most of this is due to the payment of premiums for early deliveries, and these, as a rule, are not for sufficient quantities to establish a quotation. Moreover, this premium business is somewhat elusive, as neither buyers nor sellers are apt to talk too much about it.

The Western coal trade is troubled at present chiefly about transportation. The opening of lake traffic has increased the demand for cars and mo-

tive power, and the railroads do not seem to be able to meet the requisitions promptly. The consequence has been a great deal of delay in supplying cargoes for lake vessels, as well as at the mines, and shippers are seriously embarrassed. The railroads seem to have done little towards meeting the increased requirements for transportation.

The bituminous coal trade to the seaboard is in good condition. Demand continues large, but the trade is gradually working down to a better and regular supply. The chief trouble at present is a short supply of vessels at tidewater ports.

The anthracite trade is also very active, the demand being very large for the season. The April output was the largest ever reported for that month. Of course there is some apprehension as to a possible strike of the miners. This is referred to fully in another article. The strike—or the possibility of one—is apparently being worked very hard for political effect.

The copper market continues to show somewhat unfavorable conditions, notwithstanding the heavy consumption which continues in this country. Sales of the metal have been larger, and prices are a little better with exports about the same as they were last month. Upon the whole, the market may be said to be still in a condition where speculative alliances are weighing upon it altogether too heavily.

In other metals business has been very good, and tin has advanced under the influence of a short supply of spot. Lead remains in good consumptive demand and without change in price. The same may be said of spelter, for which the demand remains very good; while it has not been sufficient to cause any material rise in the price, the supplies offered are promptly taken up by buyers.

A slight re-action in silver is noted, prices having advanced moderately, chiefly on account of buying for India, the present low quotations being very attractive to the bazaars. Other conditions of the market are unchanged, and there seems to be no probability of any betterment soon, as any increase in price is met by offers to sell; while the impression of large stocks on hand still overhangs the market.

⚒

COAL PRODUCTION IN PENNSYLVANIA.

We are indebted to Mr. James E. Roderick, Chief of the Bureau of Mines of Pennsylvania, for advance statements of the coal output of that State in 1901, as compiled from the mine inspectors' reports. These show a total production of all kinds of coal amounting to 140,820,187 tons, or about 45 per cent of the total mined in the United States. Of the Pennsylvania production 59,905,951 tons—42.5 per cent of the total—were anthracite, and 80,914,236 tons—57.5 per cent—bituminous coal.

The production of anthracite coal in 1901 is shown in the following table, in comparison with that for the previous year:

	——1900.——		——1901.——		Changes.
	Tons.	Per ct.	Tons.	Per ct.	Tons.
Coal shipped	45,271,608	88.3	53,447,902	89.2	I. 8,176,294
Used at collieries	4,880,933	9.6	5,279,375	8.8	I. 398,442
Employees and local trade	1,064,777	2.1	1,178,674	2.0	I. 113,897
Total mined	51,217,318	100.0	59,905,951	100.0	I. 8,688,633

The total increase in tons mined was 17 per cent, the largest gain shown in any one year for many years. The production in the year 1900, it will be remembered now, was reduced by the miners' strike in that year; but the output of 1901 exceeded even that of 1899 by 5,871,727 tons, or 10.9 per cent, and was the greatest in the history of the trade. This result was secured in spite of serious interruptions by floods to the work of the collieries during the latter part of the year.

The work done last year in the anthracite mines required the services of 147,651 employees of all grades, or only 3,825 more than in 1900. The average working time was greater, however, being 194.5 days. The average quantity of coal mined per employee was 406 tons; per day's work, 2.09 tons. A large quantity of explosives were used, 1,520,804 kegs of powder and 4,155,685 pounds of dynamite. This shows an average of 39.4 tons mined to a keg of powder.

In mine haulage the steam locomotive is still the chief favorite in the anthracite country. We find that there were 453 locomotives in use in the mines last year, of which 40 were driven by electricity, 51 by compressed air and 362 by steam. This is an increase over the previous year of 2 electric and 21 compressed air motors, but a decrease of 3 steam locomotives. There were 16,059 mules and horses in use, an increase of 351.

The miscellaneous statistics show that there were in use at the anthracite mines for furnishing power 5,300 boilers, 4,133 steam engines, 66 electric dynamos and 140 air compressors. The quantity of water raised in these mines is large, as shown by the reports. There were 858 pumps at work last year, having a total rated capacity of 785,489 gallons per minute. The total actual duty performed was 453,255 gallons per minute. Using the latter figure we find that in the anthracite region there was an approximate average of 3,977 gallons of water raised for one ton of coal mined.

The table prepared by the Bureau for the bituminous coal districts of the State shows an increase in the total coal mined of 2 per cent only, or somewhat less than might have been expected. The figures for two years are compared in the table below:

	——1900.——		——1901.——		Changes.
	Tons.	Per ct.	Tons.	Per ct.	Tons.
Shipments of coal	58,564,654	73.8	59,974,631	74.1	I. 1,409,977
Consumed in making coke	18,702,721	23.6	18,495,487	22.8	D. 207,234
Sold at mines	723,731	0.9	1,008,457	1.2	I. 284,726
Used in mining	1,327,256	1.7	1,435,661	1.9	I. 108,405
Total mined	79,318,362	100.0	80,914,236	100.0	I. 1,595,874
Coke made	12,185,112	...	13,125,156	...	I. 940,044
Tons used to 1 ton coke	1.53	...	1.41	...	D. 0.12

The small rate of increase was chiefly due to the difficulties attending transportation during the later months of the year. The delay in shipments and the inability of the railroads to handle the coal offered, restricted production to a considerable extent. To this cause also is due the smaller number of days worked. The mines were prepared for a larger production; this is shown by the fact that the number of employees increased by 9.6 per cent. The average coal mined in 1901 was 688 tons per employee; or 3.18 tons per day's work.

The quantity of explosives used in mining bituminous coal was very much less than that consumed in the anthracite field. The report gives the total as 314,060 kegs of powder and 693,801 pounds of dynamite. No statistics are given as to the number of machines employed in mining.

In mine haulage there were used in the bituminous districts last year 388 locomotives, of which 134 were actuated by steam, 23 by compressed air and 231 by electricity. This shows an increase of 15 steam, 6 compressed air and 57 electric locomotives—78 in all—over the report for 1900. In addition to this there were 10,108 horses and mules used in 1901, which is an increase of 475 over the previous year.

The miscellaneous statistics show that 1,893 boilers and 1,372 steam engines were in use last year. There were 241 electric dynamos and 255 air compressors at work. The number of pumps at the mines was 702, their total capacity being 252,523 gallons per minute; while the average actual duty performed was 132,603 gallons per minute. This would give an average of about 861 gallons of water raised for 1 ton of coal mined; a figure very much less than the corresponding average for the anthracite region.

The coke production last year exceeded the great output of 1900, showing an increase of 7.7 per cent. This was made with an increase of 1,725—5.4 per cent—in the number of ovens, which the report gives as 31,845 last year. The average yield of coke was greater, only 1.41 tons of coal having been used, on an average, to the ton of coke, against 1.53 tons in 1900; that is, the average product of coke was 71 per cent, against 65.4 per cent in the earlier year.

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THE ANTHRACITE LABOR SITUATION.

The daily press of late has had much to say about a possible general strike of the miners in the Pennsylvania anthracite field. Rumors of the wildest sort have been current, and it has been difficult for the public to perceive the underlying facts in the situation. There have been positive assurances that there will be no strike; at the same time certain members of the Civic Federation, which has been acting as intermediator for the miners, have asserted that the situation is very grave. Without going into the political aspects of the controversy between the miners and operators, though it is safe to say that the political features are those most considered by certain of the persons interested, we can, at least, point out certain basal facts.

In the first place, the anthracite trade, by reason of the general prosperity of the country and the firm control on production exercised by the so-called community of interest, is in an exceptionally favorable condition. As THE ENGINEERING AND MINING JOURNAL has pointed out time and again, the history of the trade up to within a very few years has been one of over-production and reckless competition varied by occasional visionary attempts to put the trade on a profitable basis. Whatever may be said against the present control of production and prices, the fact remains that it has brought order out of chaos and profits out of impending bankruptcy. The various mining and transportation companies are in closer alliance than ever, the individual producers are constantly becoming fewer as their properties are purchased by the large concerns, and the control of the trade is in strong hands. At the same time, in spite of the wild statements of irresponsible newspapers and the opinions of very many people, the miners are sharing the prosperity of the trade. In fact, it is safe to say that the average condition of the anthracite mine workers to-day is better than it has been in 30 years. Their incomes now compare with those gained during the period of inflated values at the close of the Civil War. It is even probable that their present wages, considering the general average of prices on all commodities, are better.

As readers of THE ENGINEERING AND MINING JOURNAL are aware, the miners have never suffered much from actual low wages, though their yearly earnings have often been miserably insufficient. This is because anthracite coal has been in most demand during but about half the year, while during the other half year the mines were idle much of the time. No farther back than July, 1898, for instance, many of the mines around Wilkes-Barre worked but one or two days a week, and the miners' monthly earnings must have been very low, though the actual rates for mining per day or per ton of coal were unchanged. It is one of the beneficent features of the present community of interest that by selling coal at certain graded discounts during the spring and early summer, it stimulates the buying of coal during those months, thus distributing production more

evenly and giving steadier work to the mine employees. The more experienced and wiser men among the leaders of the United Mine Workers doubtless recognize this fact; at the same time, it must be remembered that the great mass of the workers in the Pennsylvania anthracite mines are of foreign birth, having slight acquaintance with American traditions and knowing practically nothing about the history of the development of the anthracite trade. These ignorant and prejudiced men are easily worked on by unscrupulous leaders seeking political power, and are made to feel that they are victims of capitalists and the slaves of the coal barons.

Contrary to general belief, the work of the miners themselves, the most influential of the rank and file of the union, is not hard and is very well paid. Most of the miners, at least in the Wyoming and Lackawanna fields, work on contract, getting so much per car of coal mined. A miner goes to work at, say 8 o'clock, tells his laborer, whom he hires, where to put in certain shots, and looks on. The laborer drills the holes, lets off the blasts and then shovels the coal into the mine cars. The miner may be all through by 10 or 11 o'clock, and for the time spent below ground he may get $3.00, while his laborer works perhaps ten hours and gets $1.75. One of the reasons for the present agitation over an increase of wages and an eight-hour workday is that the laborers are becoming restive under their treatment by the miners and the latter are seeking to have the companies guarantee wages which they themselves are not willing to pay.

There is not the slightest excuse for a general strike in the anthracite regions at present, and the Miners' Union, if it seeks to impose unreasonable conditions upon the mining companies, will incur grave responsibilities. It must be remembered that while the trade is in a prosperous condition and the mining companies are better off than for years, yet all the companies are not yet on a sound financial basis. This is shown by their reports. Again, the past winter saw the most destructive floods ever known in the coal regions. The total damage to property was enormous. Not only were railroad bridges swept away and tracks badly damaged, but certain mines were closed for weeks, and the cost of repairs to the flooded workings has been very great. It is probably safe to say that the railroads and mining companies engaged in anthracite business suffered total losses of not less than $5,000,000. Under these circumstances, it is but natural that the operators should refuse to advance wages, or to establish a minimum wage rate or an eight-hour day. If a strike comes, it will undoubtedly be protracted and cause much bitter feeling. The mining companies, however, can, in part at least, make up their losses by the higher prices coal will undoubtedly command next fall. Thus the public will be called upon to pay the operators' bill, while the miners themselves are likely to get little benefit.

As this is written, it is understood that the miners' representatives have voted in favor of submitting the questions at issue to arbitration, a proposition which the operators, however, do not seem inclined to accept.

OIL PROFITS IN GERMANY.—The German branches of the Standard Oil Company show continued prosperity. In the year 1901 the Mannheim-Bremen Petroleum Company earned a gross profit of $714,035, and a net profit of $334,070, the latter allowing payment of a dividend at the rate of 44 per cent for the year. The German-American Petroleum Company showed a gross profit of $1,313,100, and a net profit of $852,300. No announcement is made of a dividend, but the net profits permit of a 38 per cent distribution on the capital stock.

THE UNITED STATES STEEL CORPORATION.

A statement supplementary to the annual report of this company has been published, which shows in a striking way the magnitude of its operations for its first fiscal year, which ended March 31, 1902.

The total amount of ore mined by the corporation in the Lake Superior Region was 13,326,705 tons, distributed over the various ranges as follows:

	Tons.
Marquette Range	1,336,215
Menominee Range	1,951,160
Gogebic Range	1,810,792
Vermillion Range	1,872,214
Mesabi Range	6,356,324
Total	13,326,705

This was about 64 per cent of the entire output of the region.

The product of pig iron, spiegel and ferro-manganese by the corporation aggregated 7,152,121 tons, or 45 per cent of the total production of the United States. These three items showed as follows:

	Tons.
Pig iron	6,961,543
Spiegel	134,064
Ferromanganese	56,514
Total	7,152,121

The extent of this production will be better appreciated when it is stated that the total was equal to about seven-eighths of the entire production of Great Britain, or to nine-tenths of that of Germany.

The United States Steel Corporation's steel ingot production was 9,034,580 tons, or 67 per cent of the total production of the United States. Of this amount, 6,262,202 tons were bessemer and 2,772,378 tons were open-hearth.

The following table shows the amount of the various finished products manufactured by the company:

Rails	1,675,628
Blooms, billets, and slabs (for shipment)	2,481,227
Plates	742,508
Merchant steel, shapes, bars, hoops and bars	1,236,343
Sheets	415,299
Tin plates	404,746
Wire and wire products	1,078,838
Tubes and pipes	693,655
Axles and forgings	90,659
Angle bars and joints	127,582
Structural work, (bridge company)	489,506
Miscellaneous	50,877
Total tons	9,486,868

The amount of coke manufactured was 9,079,142 tons.

The steel manufacturing properties made shipments, including those between companies, of 10,023,837 tons. The manufacturing cost of these was $315,662,881, and the selling value was $410,643,625, showing an apparent profit of $94,980,793.76. The coke shipments, including coke manufactured and purchased for resale, were 10,970,768 tons, manufactured at a cost of $12,453,346, and of a selling value of $18,936,301. This shows an apparent profit of $6,482,955.09.

The gross earnings of the transportation companies were $29,511,012, and the operating expenses and taxes were $16,431,006. This shows net earnings of $13,080,006.

The outlays for repairs, maintenance, and extraordinary renewals aggregated for the steel making, coke, and transportation properties $24,541,689. In the case of mining properties, the outlays for repairs are so closely allied to operating expenses that no separation has been attempted. It is, therefore, quite impossible to give the amount of these expenses. The outlays for repairs, etc., were divided as follows:

Steel-making properties	$19,208,336
Coke properties	881,763
Transportation properties	4,451,590
Total	$24,541,689

The freight charges paid during the year by producing and manufacturing companies to transportation companies, not including charges on ore paid to its own railroads and steamship lines, aggregated $54,147,567.

The average number of employes in service during the year was 158,263, and the total wages paid were $112,829,198.

THE DETERMINATION OF PARAFFIN IN PETROLEUM RESIDUES, ETC.[1]

By CLIFFORD RICHARDSON.

In my laboratory there is often occasion to determine the percentage of paraffin in the petroleum residuum, or tar, used as a fluxing agent in the asphalt paving industry, in the mixtures of this with various asphalts, known as paving cements, and in the residues from asphaltic oils, known as oil asphalts, which at times contain small amounts of paraffin, as in the case of the residues from the petroleum from the Beaumont field.

Efforts have been made, therefore, to adapt the method of Holde[2] which is not applicable to residues, etc., to such cases, or rather to prepare materials of this description by a preliminary treatment so that the paraffin which they contain may be separated by that method.

For this purpose one, two or more grams of the substance to be examined is taken and covered in an Erlenmeyer flask with 100 cc. of 88° naphtha. The amount will depend on the paraffin present and on the percentage of oil which remains after the preliminary treatment with naphtha and acid. Of a residuum or tar from Eastern pipe line oils one gram is sufficient, as the substance consists of a nearly purely bitumen containing from six to twelve per cent of paraffin. Ten grams of a residue from Beaumont oil should be used, as this, in some cases, contains only 78.0 per cent of its bitumen soluble in naphtha, less than 50.0 per cent unacted on by acid, and only about 1.0 per cent of paraffin. Several grams can be taken of a Trinidad asphalt cement, made of asphalt and Pennsylvania residuum, which contains 26.0 per cent of mineral matter and only 70.0 per cent of its bitumen in a form soluble in 88° naphtha.

The naphtha is allowed to act on the substance over night and the next morning the solution is decanted through a Gooch crucible. The residue is washed well with naphtha and the combined solution and washings united. The insoluble residue remaining on the asbestos felt can be weighed and the amount of soluble bitumen determined by difference if desired. In the case of carefully prepared residues from paraffin petroleum, this naphtha solution may be evaporated in the flask in which the paraffin is to be separated, and the subsequent determination by the Holde method carried on with this residue of bitumen soluble in naphtha, but, as will be seen, the results obtained are too high. Where asphaltic oils are present in the naphtha-soluble bitumen, and preferably in all cases except those of distillates, a further treatment is necessary. For this purpose the naphtha solution is placed in a separatory funnel and shaken with sulphuric acid, specific gravity 1.84, until a fresh portion of acid is but slightly colored. Twice is generally sufficient. The solution is washed with water several times, then with a weak solution of carbonate of soda, again with water, and the bitumen in solution recovered, weighed, if desired, and treated by the Holde method for the separation of the paraffin it contains.

Some determinations made in the manner described resulted as follows:

PETROLEUM RESIDUUM FROM PIPE LINE OIL.

Wt. taken (grams.)	Specific Gravity, 0.93. Soluble in Naphtha.	Not acted on by H_2SO_4.	Per cent Paraffin.
1. 1.0	96.0%	No treatment.	7.95
2. 1.0	96.0%	89.5%	5.55
3. 1.0	Distilled in vacuo.	No treatment.	5.95
TRINIDAD ASPHALT CEMENT.			
1. 10.0	.....	No treatment.	2.95
2. 10.0	.....	.....	.95

In each case the paraffin recovered after treatment was white and pure, while that obtained in the other way, even by distillation in vacuo, was colored. The results after treatment were of course lower and more correct.

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[1]Abstract of a paper read by title before the New York Section, Society of Chemical Industry, April 25.

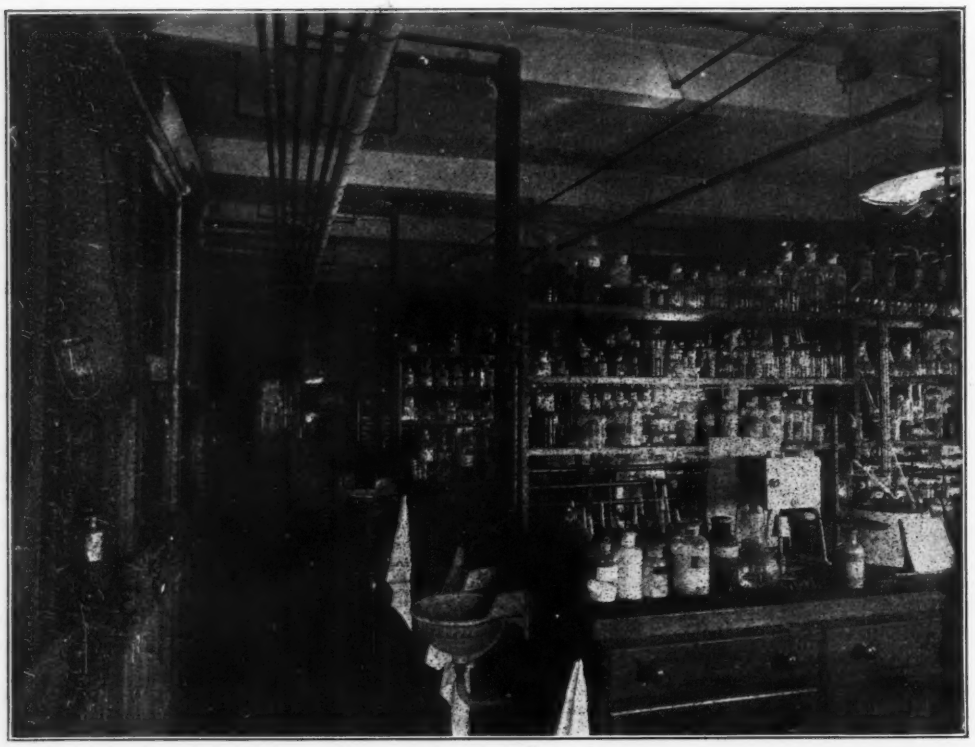
[2]Mitt. a. d. Konig. Versuchsanstalt zu Berlin 14, 211 (1896).

A NEW GOVERNMENT LABORATORY AND ITS WORK.

By GEORGE STEIGER AND E. T. ALLEN.

The Chemical Department of the United States Geological Survey has recently established itself in new quarters. The new laboratories, which have been planned with a great deal of care, are commodious, fully equipped and admirably suited to the work for which they were designed.

When the department was first organized in 1883, under the direction of Prof. F. W. Clarke, it occupied a portion of the National Museum. A few years later the Survey laboratories at Denver and San Francisco, in charge of Dr. W. F. Hillebrand and Dr. W. H. Melville respectively, were incorporated with the Washington laboratory. Up to 1892 the laboratory remained in the Museum, where the room was sufficient for its purposes; but at that time, Congress having greatly reduced the appropriation for the Survey, the chemical department was moved to the Hooe building on F street, whither the other departments had preceded it. Though the number of chemists had been cut down to half the former number, the space here was quite inadequate for those who remained, and the rooms in nearly every way were ill-adapted to the careful work carried on in them. Nevertheless, it was not till July, 1900, that increased appropriations seemed to warrant the outlay which has been recently made.



A NEW GOVERNMENT LABORATORY—MAIN LABORATORY.

The new laboratories are three in number. The largest is 20 by 40 feet, and the other two about half this size. One of the smaller rooms is to be used for assaying and other special work. In the analytical laboratories the accommodations are ample for six men. There are altogether six double desks, two of which are 4½ by 10 feet, and two 4½ by 13 feet, and three side desks 2½ feet in width and varying in length from 13 to 16 feet. The desks present no strikingly new feature, though they are more carefully constructed than is usual. The tops are of kiln-dried oak in three layers, so fitted together that warping is reduced to a minimum. The rest of the work is of white wood. Each desk is supplied with steam, blast, and exhaust besides water and gas. The exhaust is produced by a large Richards injector, which serves the purpose of a filter pump, while small injectors connected with each desk reduce the pressure practically to that of water vapor, and are used where a "high vacuum" is required. The blast is furnished by a Wigmore blower, which is driven by a small electric motor located in the basement of the building, and controlled by switches which are conveniently fixed in each room. Another appliance which is worth mentioning is a large kettle of tinned copper, in which distilled water is kept constantly hot. Each laboratory possesses one or more of these kettles. The water in them, though liable to contamination by the slightest traces of copper (probably in a purely mechanical way) is of course purer than water which has been heated in glass.

No feature of the laboratory is more satisfactory than the ventilation. A 24-in. fan which has a maximum capacity of about 9,000 cubic feet of air per minute, gives sufficient draft to carry off foul gases from the hoods and keep the air of the rooms constantly fresh. There are in fact two of these fans, though only one is in operation at a time. There are three hoods, one of which is 3 by 19 feet and the other two 3 by 16 feet. Like the desks they are built of white wood with oak tops. They are traversed from end to end by wooden flues, one just below the roof and one cutting through the cup-boards which occupy the space beneath them. Each hood is divided by removable glass partitions into three-foot sections, so that the chemist may isolate such operations as would interfere with one another, while, should occasion require, all the sections could be thrown into one. Thus, one compartment is especially reserved for precipitation and reduction by hydrogen sulphide. The generators are set up in the cup-boards and operated by stop-cocks above. Another section is partly given up to several pieces of permanent apparatus—Cooke's apparatus for ferrous oxide in silicates, evaporators for the volatilization of silica, and generators for carbon dioxide and hydrogen. Each hood also contains a large steam-bath of copper with sets of concentric porcelain rings. These baths may be kept running day and night.

A NEW GOVERNMENT LABORATORY—SMALL LABORATORY.

The assay laboratory which is now in the process of equipment will contain three Reichhelm gas furnaces, a No. 1 Reichhelm blower and a one-horse-power motor. The furnaces are comparatively small, since the volume of work in this line is not large. The muffle furnace carries a 6½ by 12-inch muffle. The smaller of the two melting furnaces takes but a single 5½-inch crucible, and is intended chiefly for preparation work while the larger has a capacity sufficient for four 7-inch crucibles, so that it may serve if desired in testing rocks for minute quantities of precious metals, as well as for ordinary assaying. Besides the common accessories for assaying, the laboratory will be equipped with several bomb furnaces and combustion furnaces.

The modern laboratory is not complete without its work-shop. That belonging to the Survey is a room 19 by 22 feet. It contains benches, lumber and tools for carpenter work, a two-horse-power lathe, a water-still having a capacity of about three gallons per hour and two McKenna ore grinders. Two men are kept constantly busy, sampling, grinding, building apparatus, preparing solutions, and keeping the laboratories in order. Rocks, minerals and ores for analysis are first reduced on a small block of chilled steel with an ordinary hammer to a very coarse powder, then finished in the ore grinders. The latter, which have been in operation for several months, do the work satisfactorily, and the danger of contaminating the samples is less than when the work is done by hand. Since the machines require very little attention, the time saved is an important consideration.

An office containing a desk for each chemist affords facilities for reading and writing. Journals and other books of reference are here at hand. The Survey library contains all the important chemical journals of the day, and these will eventually be placed in the office where they will be directly accessible at any hour. Including the well-equipped stock-room and balance-room, the department occupies about 2,800 square feet of floor space.

The routine work of the laboratory includes the chemical examination of any material, the study of which enters into geological problems. Rock analysis at present consumes more time than any other work. A large number of careful analyses have been made as a contribution to the petrographical classification of rocks. A scheme of analysis has been worked out with great pains, and it is safe to say that the rock analyses which have been made here are the most complete and accurate on record. All operations in which glass or porcelain would be attacked are conducted in platinum, of which the laboratory possesses a remarkably complete equipment. Dishes of all capacities up to 1½ liters, crucibles specially constructed for special purposes, stills, forceps, spatulas, etc., are provided, in addition to the ordinary platinum utensils. About fifteen constituents are generally determined in a rock analysis, though the number occasionally reaches 25 or 30, These are expected to add up between the limits of 99.75 and 100.5 per cent. As a result of several thousand rock analyses, some interesting points appear. Thus, titanium is found almost invariably, and barium, strontium, and lithium usually occur in small quantities. The "acid" rocks quite frequently contain a few hundredths of a per cent of zirconium, while the more "basic" ones not infrequently contain vanadium, generally contain chromium, and sometimes nickel.

Besides the work on rocks, mineral and mine waters often have to be examined, either from an economic or a purely scientific standpoint. Coals are examined for their fuel value, clays for their adaptability to cement manufacture, and petroleums and ores for their commercial value. Another line of activity is the determination of minerals in connection with geological and petrographical studies. A large number of specimens are likewise received through the mails from outside parties and, although these specimens usually do not warrant a very thorough examination, a report is always rendered.

In addition to the routine work, a considerable amount of research work has always been carried on, an amount depending upon the demands of the time and the force at the disposal of the department. It is the intention in the future to increase the volume of research. The original contributors of the department have followed several different lines. Thus, naturally, not a few analytical methods applying to mineral substances have been worked out. New mineral species and varieties have been here investigated and the chemical formulas for minerals determined. Another line of research has had to do with reactions which throw light on the constitution of minerals, while some excellent inorganic work which had no direct connection with geology or mineralogy has been carried out. It will be seen that nearly all the research in the past has had to do pretty directly with problems of composition. In this it has only followed the inevitable order of development in every chemical field, but the feeling is gaining ground that in the future a greater proportion of the work should follow geological rather than mineralogical lines. The study of the composition of the mineral products of nature has been carried far. There is a call for a more thorough investigation of the processes by which they form and the laws which govern these processes. The chemical reactions which are continually occurring in nature or which have gone on in the past, form a field not new indeed, but a field scarcely more than entered upon.

A NEW GOVERNMENT LABORATORY—BALANCE ROOM.

Many portions of it have been so little studied, that the reactions as commonly written are to be regarded as purely hypothetical if not erroneous. A beginning has already been made in this field, on the subject of ore deposition, and more work is hoped for in the future. At the same time the other lines of work are not to be discontinued. There is more to be done in the chemical study of minerals and upon analytical methods, and these too will receive their proper share of attention.

According to a reorganization of the department in 1900, Dr. George F. Becker was given charge of the Division of Chemical and Physical Research. The work of the Physical Laboratory is carried on by Dr. Arthur L. Day, physicist, and Mr. C. E. Van Orstrand, mathematician. The chemical work is carried on by Prof. F. W. Clarke, Chief Chemist, and Drs. W. F. Hillebrand, H. N. Stokes, George Steiger, and E. T. Allan. Below is appended a catalogue of the papers published by the division.

Bulletin No. 9.
Mineral, rock and ore analyses, by F. W. Clarke and T. M. Chatard.
Water analyses, by F. W. Clarke and T. M. Chatard.
The estimation of alkalies in silicates, by Thomas M. Chatard.

Bulletin No. 20.
Contributions to the mineralogy of the Rocky Mountains, by Whitman Cross and W. F. Hillebrand.

Bulletin No. 27.
Topaz, from Stoneham, Maine, by F. W. Clarke.
On the separation of titanium and aluminum, with a note on the separation of titanium and iron, by F. A. Gooch.
A method of filtration by means of easily soluble and easily volatile filters, by F. A. Gooch.

Bulletin No. 42.
Researches on the lithia micas, by F. W. Clarke.
The minerals of Litchfield, Maine, by F. W. Clarke.
Turquoise from New Mexico, by F. W. Clarke and J. S. Diller.
The gneiss dunyte contacts of Corundum hill, North Carolina, in relation to the origin of corundum, by Thomas M. Chatard.
A method for the separation and estimation of boric acid, with an account of a convenient form of apparatus for quantitative distillations, by F. A. Gooch.
A method for the separation of sodium and potassium from lithium by the action of amyl alcohol on the chlorides, with some reference to a similar separation of the same from magnesium and calcium, by F. A. Gooch.
The indirect estimation of chlorine, bromine and iodine by the electrolysis of their silver salt, with experiments on the convertibility of the silver salts by the action of alkaline haloids, by J. Edward Whitfield.
On two new meteoric irons and an iron of doubtful nature, by R. B. Riggs.

Bulletin No. 47.
Analyses of waters of the Yellowstone National Park, with an account of the methods of analysis employed, by Frank Austin Gooch and James Edward Whitfield.

Bulletin No. 55.
Studies in the mica group, by F. W. Clarke.
The analysis and composition of tourmaline, by R. B. Riggs.
Notes on certain rare copper minerals from Utah, by W. F. Hillebrand and H. S. Washington.
Mineralogical notes, by W. F. Hillebrand.
Analyses of natural borates and borosilicates, by J. Edward Whitfield.
Meteorites from Johnson County, Arkansas, and Allen County, Kentucky, by J. Edward Whitfield.
Scorodite from the Yellowstone Park, by J. Edward Whitfield.

Bulletin No. 60.
The chemical structure of the natural silicates, by F. W. Clarke.
Some nickel ores from Oregon, by F. W. Clarke.
Natural soda; its occurrence and utilization, by Thomas Marean Chatard.
Analyses of six new meteorites, by J. Edward Whitfield.
Two sulphantimonites from Colorado, by L. G. Eakins.
Coefficients of volatility for aqueous chlorhydric acid, by Robert B. Warder.
Analyses of jade, by F. W. Clarke.
Mineralogical notes.

Bulletin No. 64.
A theory of the mica group, by F. W. Clarke.
A platiniferous nickel ore from Canada, by F. W. Clarke and Charles Catlett.
A new occurrence of gyrolite, by F. W. Clarke.
Analyses of three descloizites from new localities, by W. F. Hillebrand.
A new meteorite from Mexico, by J. Edward Whitfield.
Dumortierite from Harlem, N. Y., and Clip, Arizona, by J. S. Diller and J. E. Whitfield.

Bulletin No. 78.
Experiments upon the constitution of the natural silicates, by F. W. Clarke and E. A. Schneider.
The relative abundance of the chemical elements, by F. W. Clarke.
On the occurrence of nitrogen in uraninite and on the composition of uraninite in general, by W. F. Hillebrand.
Metacinnabarite from New Almaden, California, by W. H. Melville.
An apparatus for the determination of water in the mineral analysis, by Thomas M. Chatard.
The separation of titanium, chromium, aluminum, iron, barium and phosphoric acid in rock analyses, by Thomas M. Chatard.
Seven new meteorites, by L. G. Eakins.
On a petroleum from Cuba, by H. N. Stokes.
On a supposed mineral resin from Livingston, Montana, by H. N. Stokes.

Bulletin No. 90.
On the constitution of certain micas, vermiculites, and chlorites, by F. W. Clarke and E. A. Schneider.
New analyses of uraninite, by W. F. Hillebrand.
On the isomorphism and composition of thorium and uranous sulphates, by W. F. Hillebrand and W. H. Melville.
Powellite calcium molybdate; a new mineral species, by W. H. Melville.
Mineralogical notes, by W. H. Melville.
New analyses of astrophyllite and tscheffkinite, by L. G. Eakins.
Two new meteorites, by L. G. Eakins.
On the action of phosphorous oxychloride on the ethers and chlorhydrines of silicic acid, by H. N. Stokes.
On the colloidal sulphides of gold, by E. A. Schneider.

Bulletin No. 113.
Tschermak's theory of the chlorite group and its alternative, by F. W. Clarke.
The constitution of the lithia micas, by F. W. Clarke.
Experiments upon the constitution of certain micas and chlorites, by F. W. Clarke and E. A. Schneider.
Notes on the action of ammonium chloride upon silicates, by E. A. Schneider and F. W. Clarke.
The preparation and specific gravity of crystallized uranium dioxide, by W. F. Hillebrand.
A further example of the isomorphism of thoria and uranium dioxide, by W. F. Hillebrand.
The composition of rowlandite and mackintoshite, by W. F. Hillebrand.
Zinc-bearing spring waters from Missouri, by W. F. Hillebrand.
Josephinite, a new nickel iron, by W. H. Melville.
A new meteorite from Hamblen County, Tenn., by L. G. Eakins.
On the catalytic action of aluminum chloride on silicic ethers, by H. N. Stokes.
Note on benzyl silicate, by H. N. Stokes.
On amidophosphoric acid, by H. N. Stokes.
On some organo ols, by E. A. Schneider.
On the preparation of a pure hydrosol of silver, by E. A. Schneider.
Contributions to the knowledge of colloidal silver, by E. A. Schneider.

Bulletin No. 148.
Analyses of rocks, with a chapter on analytical methods, laboratory of the United States Geological Survey, 1880-1896, by F. W. Clarke and W. F. Hillebrand.

Bulletin No. 167.
Experiments relative to the constitution of pectolite, pyrophyllite, calamine, and analcite, by F. W. Clarke and George Steiger.
The constitution of tourmaline, by F. W. Clarke.
The colorimetric estimation of small amounts of chromium, with special reference to the analysis of rocks and ores, by W. F. Hillebrand.
Volumetric estimation of vanadium in presence of small amounts of chromium, with special reference to the analysis of rocks and ores, by W. F. Hillebrand.
Distribution and quantitative occurrence of vanadium and molybdenum in rocks of the United States, by W. F. Hillebrand.
Warning against the use of fluoriferous hydrogen peroxide in estimating titanium, by W. F. Hillebrand.
Mineralogical notes, by W. F. Hillebrand.
On the chloronitrides of phosphorus and metaphosphimic acids, by H. N. Stokes.
On a hydromica from New Jersey, by F. W. Clarke and N. H. Darton.
The alkaline reaction of some natural silicates, by F. W. Clarke.
The solubility in water of certain natural silicates, by George Steiger.

Bulletin No. 168.
Analyses of rocks, laboratory of the United States Geological Survey, 1880 to 1899, tabulated by F. W. Clarke, chief chemist.

Bulletin No. 176.
Some principles and methods of rock analysis, by W. F. Hillebrand.

Bulletin No. ——
On pyrite and marcasite, by H. N. Stokes.

The following work has been published in current journals and has not as yet appeared in Survey publications:

On emmonsonite, a ferric tellurite; *Proceedings,* Colorado Scientific Society.
Note on emmonsonite, appended to a paper, by Dana and Wells, on some selenium and tellurium minerals from Honduras: *American Journal of Science,* XL, 1890.
Mineralogical notes (samarskite; an ill-defined zirconium mineral; a sulphide of copper, silver and zinc; an argentiferous arsenic of nickel and cobalt): *Proceedings,* Colorado Scientific Society, Vol. III, 1888.
Additional notes on the tyrolite from Utah, by W. F. Hillebrand and E. S. Dana: *American Journal of Science,* XXXIX, 1890.
The wide-spread occurrence of barium and strontium in silicate rocks: *Journal,* American Chemical Society, XVI, 1894.
The estimation of small amounts of barium and strontium in silicate analysis: *Journal,* American Chemical Society, XVI, 1894.
A plea for greater completeness in chemical rock analysis: *Journal,* American Chemical Society, XVI, 1894.
Report of commission on coal analysis: *Journal,* American Chemical Society, XXI, 1899.
On carnotite and associated vanadiferous minerals in Western Colorado, by W. F. Hillebrand and F. Leslie Ransome: *American Journal of Science,* X, 1900.
The relative values of the Mitscherlich and hydrofluoric acid methods for the determination of ferrous iron, by W. F. Hillebrand and H. N. Stokes: *Journal,* American Chemical Society, XXII, 1900.
Report on current analyses, etc: *Journal,* Society of Chemists, Ind., December, 1901.
The composition of yttrialite, with a criticism of the formula assigned to thalenite: *American Journal of Science,* Vol. XIII, 145, 1902.
On trimetaphosphimic acid and its decomposition products: *American Chemists' Journal,* XVIII, 629.
On tetrametaphosphimic acid: *American Chemical Journal,* XVIII, 780.
On the chloronitrides of phosphorus (II): *American Chemists' Journal,* XVIV, 782.
On the metaphosphimic acids (III): *American Chemists' Journal,* XX, 780.
A new stony meteorite from Allegan, Michigan, and a new iron meteorite from West Texas, by G. P. Merrill and by H. N. Stokes: *Proceedings,* Washington Academy of Science, II, 41.
Phosphate chemistry as it concerns the miner, by T. M. Chatard: *Transactions,* American Institute of Mining Engineers, Vol. XXI.
The action of ammonium chloride upon anacite and leucite, by F. W. Clarke and George Steiger: *American Journal of Science,* Vol. IX.
The action of ammonium chloride upon natrolite, scolecite, prehnite, and pectolite, by F. W. Clarke and George Steiger: *American Journal of Science,* Vol. IX.
The action of ammonium chloride upon certain silicates, by F. W. Clarke and George Steiger: *American Journal of Science,* Vol. XIII.

OPALS IN QUEENSLAND.—Mr. C. F. V. Jackson, assistant Government geologist, Queensland, recently returned from a tour extending over four months among the opal-bearing fields in western Queensland. He left Brisbane or Cunnamulla early in September, and from there commenced his travels, which entailed an inspection of each mine on all the opal fields as far as Kynuna, 100 miles northwest of Winton, and west nearly as far as Diamantina. He says that most of the country within the limits already described is opal-bearing, and up to the last year or two opal prospecting was a paying occupation, but the industry has been going back during the last few years entirely by reason of the drouth, and the yield of precious stones for the whole of Queensland will probably show a considerable decrease at the end of this year. The opals found in the western fields are of great variety, some being of the highest quality, while others are quite valueless as gems. The best stones are generally sold to buyers in the southern States.

IRON MAKING IN TEXAS.

In an interesting paper read at the February meeting of the Engineers' Society of Western Pennsylvania, Dr. William B. Phillips sums up the iron resources of Texas. With regard to the existing furnaces, he gives a list as follows:

There are four furnaces in Texas now, all of them built for charcoal, and all of them in the East Texas District. These are as follows:

Jefferson Furnace, Jefferson, Marion County. One stack 60 by 12, built in 1889-91, blown in March 15, 1891. Two Durham iron stoves. Capacity, 13,500 tons. A rolling mill was partly finished in 1891, and was designed to contain 15 single puddling furnaces, 3 heating furnaces, and 3 trains of rolls (one 18 inch muck and one 8 inch, and one 12 inch bar.

Old Alcalde Furnace, Rusk, Cherokee County, owned by the State of Texas. One stack 55 by 9½. Built in 1883 and put in blast February 27, 1884. Hot blast. Capacity, 7,000 tons. A pipe foundry is connected with the furnace.

A NEW GOVERNMENT LABORATORY—WORK SHOP.

Star & Crescent Furnace, near Rusk, Cherokee County. One stack 65 by 11. Built in 1890-91 and blown in November, 1891. Iron stoves. Capacity, 18,000 tons.

Tassie Bell Furnace, New Birmingham, Cherokee County. One stack 60 by 11, built in 1889-90, and blown in November, 1890. Two Weimer pipe stoves. Capacity, 13,500 tons.

During the last 10 years, therefore, there have been 4 charcoal furnaces capable of making iron, with a total annual capacity of 52,000 tons. But during this period, from 1891 to 1900, inclusive, the total amount of iron made was only 71,412 tons. With a local capacity during these 10 years of 520,000 tons the actual output was 71,412 tons, or 13.7 per cent of the capacity. We have the statistics of the production of pig iron in Texas since 1872, with the exception of two years, 1875 and 1878, when the output may have been 500 tons each. The total amount of pig iron produced during these 29 years, 1872-1900, inclusive, was 120,438 tons. As already remarked, this is about enough to supply the demand for 4 years, while the furnaces in the State could produce it in 28 months.

The general conclusions reached in the summing up of the paper are as follows:

1. There are extensive deposits of limonite in east and northeast Texas, carrying from 45 to 50 per cent iron but not suited for the manufacture of bessemer pig iron. These ores can be cheaply mined and can be delivered at the furnace for from 80 cents to $1 per ton.

2. There are deposits of magnetic and hematite iron ores in Llano, Mason and Gillespie counties, of unknown extent, but of excellent quality.

3. The only available fuel is charcoal, unless Indian Territory coke can be brought in.

4. The total daily capacity of the foundries in the State is 271 tons, pig iron and scrap, of which at least 100 tons is pig iron.

5. There is an active and steady demand for Texas iron, and there would be little difficulty in marketing 100 tons a day within a distance of 150 to 200 miles.

6. The demand for pig iron, as such, is about 30,000 tons a year. Cotton ties call for 13,500 tons more, while wire fencing, wire nails, etc., would probably call for 16,500 tons. Exclusive of steel rails, merchantable steel and malleable castings, the consumption of iron, taken as pig iron, is probably about 60,000 tons a year.

7. The annual average production of pig iron in the State during the 10 years, 1891-1900, is 7,141 tons, leaving 53,000 tons to be brought in from other States.

8. The cost of producing charcoal iron in east Texas should not exceed $11, and may be reduced to $10. On account of the long haul for coke, it is not likely that the cost of coke iron would be much less than that of charcoal iron.

BURROWS PARK, COLORADO.

SPECIALLY REPORTED.

Recent discoveries and developments indicate a new mining district of promise in Colorado. Those well informed express great confidence in the future of the new Burrows Park District. The general location is southwest of Lake City, Hinsdale County, about 20 miles, and the district extends to the Engineer Mountain region and the head waters of the Animas River.

The special feature of the district appears to be the richness of the ore. So attractive are the reports that the customary invasion of prospectors and investors is promised when the season opens.

The chief mines at the present time are the Inez and Hollister, and the claims of the Tobasco Company. The Inez and Hollister claims have become the property of the Dupre Mining Company, organized by F. B. House, George D. Bardwell and J. R. Peterson. The present outfitting points for this new district are Lake City, Hinsdale County, and Silverton, in San Miguel County.

THE PORTLAND CEMENT INDUSTRY IN MICHIGAN.*

The history of the Portland cement industry in Michigan began in 1872, when the Eagle Portland Cement Company built a cement plant about two miles northeast of Kalamazoo. The factory was continued in operation until about 1882, but no traces of the kilns are now in existence. Some 3 miles of sidewalk were put down in Kalamazoo with this cement, and after 15 or 20 years of use are still in excellent condition. The next factory for making Portland cement was erected by the Peerless Portland Cement Company, in 1896 and 1897, at Union City, and was followed by the erection of the factories of the Bronson Portland Cement Company at Bronson, in 1897, and of the Michigan Portland Cement Company at Coldwater, in 1898.

Portland cement is an artificially prepared substance which has the property of hardening in the air or water when mixed with the suitable proportion of water, and of remaining hard when immersed in water. In its manufacture, a mechanical mixture of finely pulverized limestone or marl and clay or ground shale is calcined, or burned, as the common expression is, and the resulting clinker is ground to a fine powder. This is the Portland cement of commerce. In addition to the raw materials, which enter directly into the composition of Portland cement, fuel is necessary for burning them. For this purpose, in upright kilns crushed coke is generally used; and in the rotating kilns a jet of gas, of petroleum, or of finely pulverized coal is forced in by means of an air blast. The type of kiln now almost universally used in America consists of a steel cylinder about 60 feet long and 6 or 7 feet in diameter, lined with refractory material. These furnaces are rotated rapidly in a nearly horizontal position. The cement is manufactured by what are known respectively as the "wet" and the "dry" processes. In the wet process the finely ground limestone and clay are mixed with about 60 per cent of water, and this "slurry" is caused to flow into the higher end of the rotary kiln in a small stream. In the dry process the "slurry" is only sufficiently moistened to prevent it from being blown away as dust. As the "slurry" travels down the cylinder, it is raised to a white heat; and the resulting clinker runs from the rotary in a continuous stream of white-hot pellets, which, after cooling, are ground to a fine powder. The cement as it comes from the grinding machines, is of such fineness that from 90 per cent to 98 per cent of it should pass through a sieve having 100 meshes to the inch. It is then ready for use, but usually improves with age.

Portland cement is used in making the foundations for lighthouses, piers, abutments of bridges, for linings of cisterns, and for many other purposes, and a growing use is in the construction of buildings, and especially of dwellings.

The raw materials which enter into the composition of Portland cement thus far used in Michigan are limestone, marl, shale, clay, gypsum and fuel. One of the limestones used is the Dundee limestone, extending in a belt from about 2 to 9 miles wide northeast and southwest across Wayne, Monroe and Lenawee counties in the southeastern corner of the State. The stone is found also at the extreme northern end of the southern peninsula. The best Dundee limestone thus far discovered is extensively quarried at Sibley and Bellevue, near Trenton, in Wayne County, and is used by the Michigan Alkali Company for making Portland cement at Wyandotte. Another group of limestone rocks, the Traverse group, crosses Wayne and Monroe counties in a belt about 2 miles wide, and crosses also the northern end of the southern peninsula from Alpena, on the border of Lake Huron, to Frankfort, on the shore of Lake Michigan. This limestone is utilized at Alpena by the Alpena Portland Cement Company. Another limestone group, the Monroe formation, is extensively quarried in the southeastern part of the State, but its adaptability for the manufacture of Portland cement is doubtful as yet. The limestone of the Michigan series outcrops at Bayport and Sebewaing in Huron County, on the east side of Saginaw Bay on the Charity Islands, at Bellevue in Eaton County, and near the Portage River, 5 or 6 miles north of Jackson.

The marl beds of Michigan occur in abundance throughout the southern peninsula, and are known to be present also to the north of the Strait of Mackinac. These marl beds vary in extent from a few acres up to hundreds of acres, and, in many instances, for an average depth of 20 feet or more.

The shale used by the Alpena Portland Cement Company is quarried about 7 miles north of Alpena and near the shore of Lake Huron. The Cold Water shales are now quarried at a locality about 1½ miles east of Union City, and are utilized by the Peerless Portland Cement Company. The Antrim shales are exposed on the shore of Thunder Bay and also at several localities in Charlevoix County, though they have not, as yet, been used in making cement. The Saginaw shales are found in several mines near Saginaw and Bay City, and at Flushing. The Lake clays of Michigan, suitable for cement making, are distributed about the border of the southern peninsula, for example, between Detroit and Ypsilanti, about Port Huron, South Haven, Whitehall, over the Saginaw Valley, and also in numerous local basins throughout the State; but it should be noted that, in general, the surface clays of the southern peninsula are not well adapted for making Portland cement, although some of the stony clays, if crushed sufficiently fine, may be used for that purpose. It is commonly found desirable to add a small per cent of gypsum to Portland cement clinker before grinding. Michigan possesses extensive deposits of gypsum, particularly at Grand Rapids; and it is from that place that most of the Portland cement factories in this State derive their supply of gypsum.

The fuel used for heating the rotary kilns is usually bituminous coal, which has been thoroughly dried and ground to a fine dust. This dust is driven into the lower end of the kiln by means of an air blast, and on ignition produces a jet of flame some 15 feet long. Both crude petroleum and pulverized peat have been used, but coal dust is regarded as the best fuel.

The Portland cement industry has had a favorable development in Michigan in the last few years. The Bronson and Peerless Portland cement companies began operations in 1897, and by May, 1901, 10 factories were producing cement, and 6 others were in process of construction. The capacity of the 10 plants now built is about 2,400,000 barrels of cement per annum. The capital stock of all the Michigan Portland cement companies now organized is about $25,000,000, and their estimated capacity is, approximately, 8,600,000 barrels of cement per year. The total consumption of Portland cement in the United States during the year 1900 was between 10,000,000 and 11,000,000 barrels, and the amount manufactured was nearly 8,500,000 barrels. It would seem, then, that Michigan is preparing to supply a demand which does not appear to exist as yet, and as there is a similar activity in this same direction in several other States, it would appear to be evident that the Portland cement industry is in a speculative stage.

*Abstract from XXII. Annual Report of the U. S. Geological Survey, Part III.

WATER POWER IN IRON AND STEEL WORKS.—The *Bulletin* of the American Iron and Steel Association says that water power is still used in operating at least 8 blast furnaces, 13 rolling mills, and 3 pig and scrap iron bloomaries in the United States and in blowing 2 furnaces in Canada. Six of these water-power plants are located in Pennsylvania, which has an abundance of anthracite and bituminous coal to create steam power; others are located in New England, New Jersey, and other States. None of the 24 water-power plants in the United States are of modern construction, but the figures are nevertheless surprising.

THE LIMESTONE OF THE PHILIPSBURG RAILWAY AND COAL COMPANY.*

BY J. T. DONALD, M.A., MONTREAL.

In a recent article on Michigan Limestones,† A. C. Lane writes: "There is a very great demand for anything like pure carbonate of lime, and as soon as it gets near 98 per cent it can be used in the manufacture of calcium bromide and of calcium acetate in connection with charcoal kilns, the clarification of beet sugar syrup; the generation of carbon dioxide for soda water, or for making soda carbonate out of chloride."

Not all of these industries are as yet found in Canada. But there is no doubt that Canadian manufacturing is destined to grow rapidly, and it is doubtless only a question of time before all of these industries and others as yet undeveloped will be represented in Canada. With the hope that placing on record in the *Transactions* of the Institute the location and composition of a high grade limestone may in some measure, however slight, tend to the extension of Canadian manufacturing, these notes are submitted.

The Philipsburg Railway and Quarry Company's property covers some 315 acres on the outskirts of the village of Philipsburg, P. Q., and on the easterly shore of Missisquoi Bay, an arm of Lake Champlain. The whole property is a series of beds of limestone, some of which have been converted into what is practically marble. This high grade, highly altered limestone or marble exists in very large quantity. The main quarry has been opened up for a length of some 750 feet, and displays a magnificent mass, of undetermined extent, of stone of a high degree of purity. In September last the writer visited this deposit and carefully sampled the same, and submitted to analysis a fair average of the whole deposit as exposed in the development work carried on up to the date mentioned.

The analysis gave the following results: Insoluble in HCL, 1.43; ferric oxide, 0.24; lime, 54.40; magnesia, 0.30; carbonic acid, etc. (by difference), 43.63 per cent. The equivalent of carbonate of lime is 97.14 per cent; carbonate of magnesia, 0.63 per cent.

An average sample of the whole exposure was then burned, the resulting lime was analyzed along the lines required by advanced manufacturers of calcium carbide: Calcium oxide or lime, 95.79; magnesium oxide or magnesia, 0.53; sulphur, 0.103; phosphorus, 0.007; insoluble, iron oxide, alumina, etc., 3.57 per cent.

The Philipsburg limestone and lime are growing in favor as their purity becomes known. The above analyses represent as stated the average composition of the whole face of the quarry as exposed in September last. It is not improbable that a careful selection would enable shipments to be made guaranteed to contain not less than 98 per cent carbonate of lime. This Philipsburg stone makes an excellent lime for use in the manufacture of calcium carbide where a high tenor in lime and little or no magnesia, sulphur and phosphorus are required.

This limestone is also well adapted for building purposes, giving a very effective appearance.

*Paper read before the Canadian Mining Institute, Montreal.

†"Michigan Limestones and Their Uses." ENGINEERING AND MINING JOURNAL, May 25, 1901.

IRON-SAND IN NEW ZEALAND.—The London *Engineer* says: "Extensive deposits of iron-sand are said to exist at Taranaki, New Zealand. The sand is chiefly magnetic oxide of iron, and contains about 60 per cent iron, 4 per cent silica, only traces of sulphur and phosphorus, with 8 per cent of titanic oxide, which is probably the smallest proportion of titanium, together with the largest proportion of iron, in any iron-sand in the world. It is made into briquettes with clay from the district, and in the result a soft grey pig of good quality containing 1 per cent of titanium is produced at a cost of $12 per ton. From this is produced bar iron at a cost of $34 per ton, containing 0.21 per cent of titanium.

THE ACKER ELECTROLYTIC ALKALI PROCESS.*

BY CLINTON PAUL TOWNSEND.

In the *Electrical World and Engineer* for June 1, 1901, the present writer commented briefly upon the Acker cell as disclosed in recent patent specifications and referred to the interesting parallelism between the Acker process, employing a fused electrolyte and a circulating molten cathode of lead, and the mercury cathode cells for the production of caustic solutions from brine. In respect to temperature the Acker cell operates at a higher level, and this is the sole differene between the methods; molten lead is substituted for mercury, fused salt for an aqueous solution, and steam for water as the oxidant; as product, anhydrous caustic is obtained in place of a somewhat dilute solution. By reason of this parallelism, a comparison of the processes is of the greatest interest as affording a general insight into what may be called the specific characteristics of molten electrolytes and aqueous solutions.

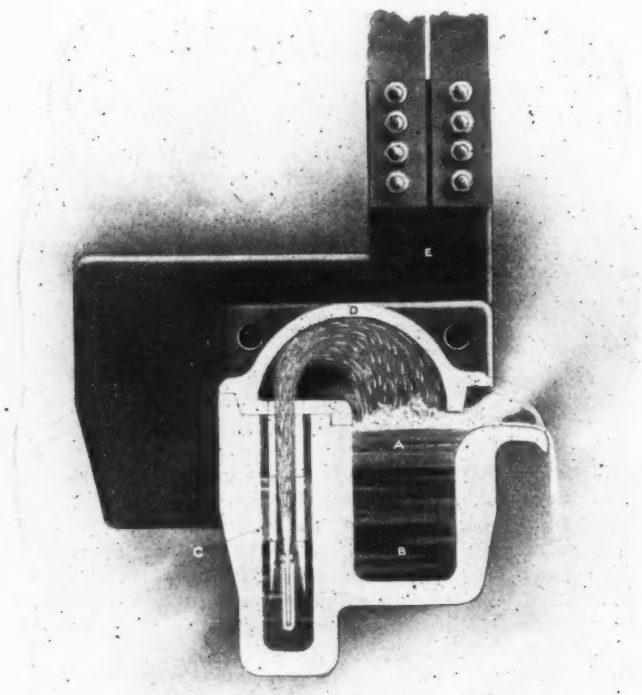


FIG. 1.—ELECTROLYTIC ALKALI PROCESS.

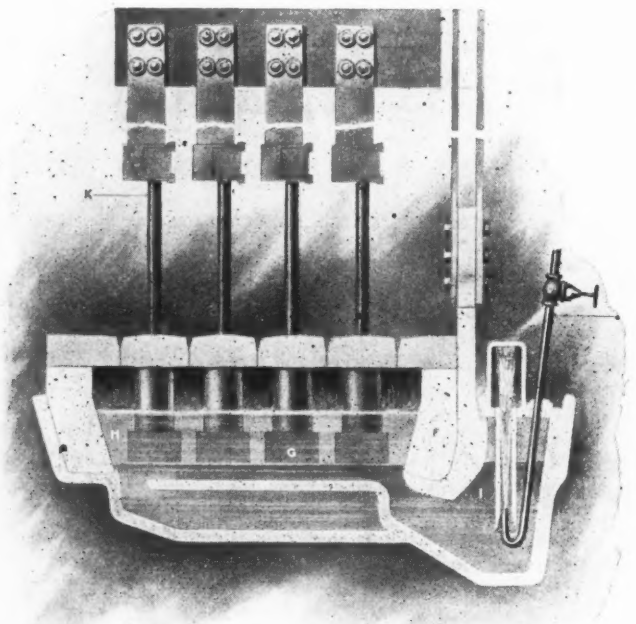


FIG. 2.—SECTION OF FUSION POTS.

As will be seen, the efficiencies of the two methods, whether calculated upon the expenditure of current or of energy, are nearly equal; in the matter of concentration of energy and of plant, the fused bath process possesses an enormous advantage. From the theoretical viewpoint, therefore, the industrial advantage would appear to lie with the former method, and interest centers upon the installation itself, the method and handling of that *bete noir* of the electro-chemist, a fused electrolyte.

It has been the privilege of the writer, through the courtesy of Mr. Acker, to follow this process from its infancy in the experimental plant, in Jersey City, to its final form at Niagara Falls. It is not necessary at this time to relate the improvements which have from time to time beeen made; but a statement of the work of prior investigators will be of interest as more clearly indicating the character of the difficulties which had to be overcome, and as defining the limits of Mr. Acker's contribution to the progress of the art.

The earliest investigator of the lead-sodium alloys on more than a laboratory scale seems to have been Dr. A. J. Rogers, who published the results of his work in the *Proceedings* of the Wisconsin Natural History Society, the *Journal* of the Franklin Institute, the *Chemical News*, and elsewhere, about 1889. Dr. Rogers' study of these alloys was based upon materials prepared by adding sodium to lead in atomic proportions and multiples, and melting under paraffin. The characters of these alloys are accurately given, and especially he notes the rapid decomposition of water by alloys containing an excess of 20 per cent of sodium.

Dr. Rogers on one occasion prepared a considerable quantity of an alloy approximating 17 per cent of sodium, by electrolytically decomposing fused sodium chloride in a crucible containing 30 pounds of the salt and a cathode of lead, a dynamo being employed, and a current of 72 amperes passed for two hours. Owing to imperfect fusion of the salt, the electro-motive force required was exceedingly high, 21 volts, but the current efficiency seems to have been fairly good, or between 75 and 80 per cent. This investigator had no thought of the possibility of the industrial production of caustic from his alloys; their chief interest to him lay in the possibility that by their use, the De Ville process at that time the only commercial method for the reduction of aluminum, might be cheapened, but it is nevertheless true that he did make caustic soda from lead sodium alloy. Dr. Rogers was also entitled to credit for employing a basic lining in his electrolyzing apparatus. He tried the various basic linings, including hydrated alumina well fired, some "shrunk" magnesia linings such as is used in basic steel furnaces, etc. Magnesia linings were later suggested by two workers in this field in a different form.

Disregarding a strict chronology, reference may here be made to Dr. Borchers, who proposed to deposit sodium from its fused salts upon a flowing stream of lead, producing alloys for various industrial purposes; a current density of 3.2 amperes per square inch of cathode was deemed most suitable, the electro-motive force required, being 6 to 8 volts. A group of English inventors, Hetherington, Hurter and Muspratt likewise suggested the production of such alloys by the electrolysis of fused caustic soda, superposed upon a cathode of molten lead.

The problem was next approached by Mr. C. T. J. Vautin, and this time with the view of obtaining caustic solutions and chlorine. Sodium chloride in an externally-heated vessel, was electrolyzed with carbon anodes, and the light metal collected in a cathode of molten lead. This cathode was prolonged into a second vessel where a small surface was exposed to the action of steam from above and through the supernatant caustic, the assumption being that the alkali metal would diffuse at once throughout the body of the lead and always toward the point of removal. The assumption is, of course, entirely incorrect; the lead cathode crusts over almost at once with a light alloy and secondary reactions begin—the combination of the liberated ions, and possibly the formation of sub-chlorides—with the result of loss of sodium and rise of the electromotive force and temperature. Furthermore, the introduction of steam *above* the caustic for the purpose of oxidizing the sodium in the alloy *below* it would require that the caustic be not anhydrous, as otherwise the sodium would not be extracted. This would mean that the temperature at this point should be far below that of the bath, in fact, considerably below red heat.

Impracticable as was this plan, one of Vautin's patents contains one interesting suggestion; this was, the maintenance of the heat of the bath by the passage of the current itself which Rogers had not mentioned. It is likely, however, that the state of the art long before Vautin's experiments would have been sufficient to have led any serious investigators to employ the current for melting as well as decomposing the salt. This one point, and the basic lining due to Rogers, and also two others which are due to Acker, are the fundamental necessities of the method.

The Vautin process received a trial on a small industrial scale at Keighley, Lancashire, Eng., in 1893-1894, but was quickly abandoned. Meantime, Leon Paul Hulin, at Modane, Savoy, attacked and solved the problem, and this in a most ingenious manner. Recognizing the cause of the difficulty as the non-diffusion of the sodium through the lead, Hulin electro-deposits with the sodium that equivalent of lead which will constitute with it an alloy of the proportions desired, overcoming the lack of diffusion by avoiding all necessity for diffusion. Mixed chlorides of sodium and lead are electrolyzed with anodes of both carbon and lead, the latter connected in circuit through a rheostat to govern the proportion of the total current passing through it, and hence the proportion of lead dissolved and deposited.

*From the *Electrical World and Engineer*, New York, April 5, 1902.

In practice, (for this process has until recently been in commercial operation at Cavet-Clavaux, Savoy) about 12 per cent of the total current was shunted through the metal anode. The voltage required is 7, affording under the conditions, a current density of 700 amperes per square foot of cathode surface. The current efficiency is stated to be 69.3 per cent, while the energy efficiency falls to 41.5 per cent. The alloys obtained are leached with water, and by repeated washings the concentration of the solution may be brought to 50 per cent. caustic (specific gravity 1.54). The lead is collected as sponge, for which the manufacture of storage battery plates affords some market.

If, as stated above, Hulin has solved the problem, Acker has factored it, resolving the double difficulty by a single bold expedient. This was the conception that a jet of steam might be introduced into the molten alloy to oxidize its sodium and at the same time to give to the lead such rapid circulation past the anodes that mechanical mixing might supplement the slow process of diffusion.

The accompanying illustrations require but a word of description. The fusion pots or furnaces are of iron, cast in two parts only; a body portion *L*, for containing the electrolyte, provided with a horizontal partial partition *M*, dividing the vessel into upper and lower chambers, which communicate at one end with each other and at the other with a well *I*, wherein the steam is injected; and the cover *D*, for the well, serving the purpose of deflecting the

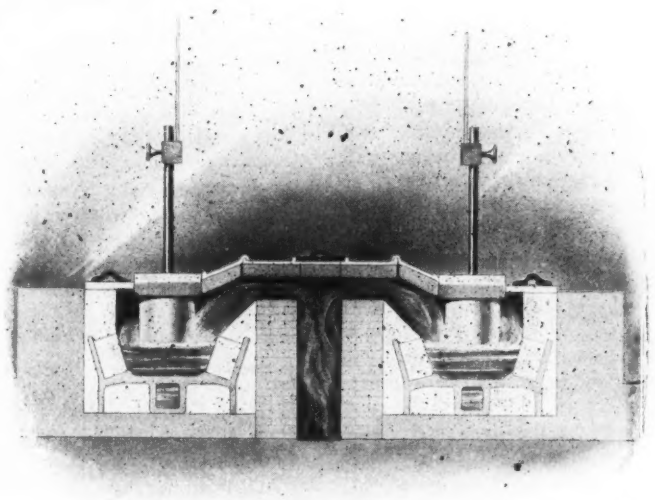


FIG. 3.—SECTION OF FUSION POTS.

mingled mass of molten lead, caustic and hydrogen, thrown upward by a steam jet, into a chamber *A*, where the constituents quickly separate, hydrogen burning freely at the orifice, anhydrous caustic overflowing to the individual collecting vessels, and the lead returning by conduits *B*, to pass again beneath the anodes in the upper chamber *H*. The steam pipe *J*, a thick-walled steel tube, discharges, as shown, into the casing *C*, forming a true injector, and constituting a most direct and positive means for circulating the cathode.

The anodes *G*, of which four are employed in each furnace, are graphitized carbon blocks, having a working face approximately 7½ by 14 inches, and carry 2,000 amperes each, or about 19 amperes per square inch. These great carbons, prepared by the International Acheson Graphite Company, are entirely unaffected by the bath; that is to say, they undergo no corrosion or chemical action properly so called, and deteriorate only from mechanical causes, the weak point being the surface of connection with the copper rods *K*. In points of fact, the problem of a resistant anode for a fused chloride is considerably less serious than is the case with aqueous solutions, for in the molten bath there are no oxidants, nor possibility of their formation; consequently ordinary dense carbons or carbon agglomerated with a proportion of graphite show equal resisting power with the graphitized blocks. The advantage of the latter lies in the superior facility with which they may be tooled, and their higher conductivity permits the use of a smaller cross-section. A sleeve of basic cement protects the conductors above their point of union with the anodes.

The furnaces are lined with magnesite bricks *F*, such as are used in basic steel furnaces. They are set without cement and inclined backward for stability; the electrolyte penetrates their interstices and in solidifying, combines them into a rigid wall, which seems to be entirely unaffected by the electrolyte or such of the products as come into contact with it.

Of these furnaces, 45 are now in operation with 11 more provided for. The current of 3,250 electrical horse power is delivered from the Niagara Falls Hydraulic Power and Manufacturing Company at 8,000 amperes and 300 volts, being transmitted directly to the factory from the power house, a distance of 1,500 feet, by great aluminum cables. The Acker Company was therefore under no necessity of installing transformers. The works began operation in December, 1900, and have been in continuous operations since that time, with the exception of one week, during which no current was delivered owing to a fire in the cable tower of the power house.

The electro-motive force between terminals in the fully heated furnace is 7 volts, and, as stated, the current is 2,000 amperes per anode or 8,000 for each furnace, each furnace absorbing therefore about 75 electrical horse power, and producing an average of 581 pounds of anhydrous caustic per day, and an equivalent of chlorine which is carried direct through conduits to the bleach house. The caustic as discharged from the furnace is anhydrous, and this irrespective of the quantity of steam injected for circulation. For at the temperature employed, hydration is impossible, whatever excess of moisture be present. As it overflows from the furnace, the caustic is gray or often green from the presence of minute quantities of iron, and perhaps of manganates, and is cleared by a few hours' settling. Of course there is no boiling down and no further concentration required. The caustic, as it leaves the furnace is probably the strongest that can be made.

The figures as given above afford data for an estimation of efficiencies; 8,000 amperes should yield in 24 hours 633 pounds of caustic, wherefore the actual output of 581 pounds represents a current efficiency of 93 per cent. The theoretical voltage required for the decomposition of fused sodium chloride is 4.2, on the basis of which we may estimate the energy efficiency of the process as 55 per cent, when the furnaces are charged with cold salt, as is now the case.

Let us compare these figures with those of the Castner-Kellner mercury cathode process, as given in the ENGINEERING AND MINING JOURNAL, volume 67, page 497.

Efficiency.	Current.	Energy.
Castner-Kellner	91 per cent	52.3 per cent
Acker	93 per cent	55. per cent

Such a comparison, it should be pointed out, is not necessarily a test of relative commercial values, nor would it be such even if installation and depreciation factors were equal in both cases; for the energy theoretically required may, and in fact does, differ widely in the two cases, and hence efficiencies are calculated as percentages of different absolute quantities. In other words, equal energy efficiencies by no means represent equal current consumption for a given output of product. To separate .8592 gram of sodium in one hour, one ampere is requisite, whether the electrolyte be fused or dissolved; but in the former case 4.2 watts are theoretically necessary, and in the latter 2.3 watts.

In the actual manufacture of alkali on a large scale by either the wet or dry process an estimate of the cost of production, which is based on the horse power required, only touches the fringe of the matter, and numerous other items, some of almost equal importance must be considered therewith.

The disadvantage of the fused bath lies, not, as has been frequently stated, in the rapid depreciation of the plant nor in any difficulties surrounding the industrial handling of the electrolyte or its products, but in the fact that for its operation a somewhat greater quantity of current is required. Its over-balancing advantage is such concentration of this energy, that the output measured by the size of the decomposing plant, or the number of units employed, is relatively enormous, and for this reason it is also true that the total depreciation per ton of output due to this enormous concentration is very low.

It should be borne in mind that the cost of evaporating the water from a weak solution is eliminated. It is interesting to consider the future possibilities of the fused bath process. A unit employing 8,000 amperes and producing nearly 600 pounds of caustic is a comparatively small electrolytic furnace employing four anodes; therefore the process seems peculiarly adapted to working on a large scale in which still greater output per unit would be possible. The delivery from large reverberatory furnaces of molten salt to a group of such units and the employment of the escaping hydrogen, at least in part, for melting purposes would seem to be indicated.

BOULDER OIL WELLS.

SPECIAL CORRESPONDENCE.

It can be safely predicted that before the first of June, of this year, the question of the existence of petroleum in commercial quantities in the Boulder and Debeque districts of Colorado will be finally settled. Since reference was first made in the JOURNAL to these districts, no new producer has been added to the three then mentioned. It is of interest to note, however, that in the Boulder District, alone, over 20 companies are sinking wells several of which are rapidly approaching the so-called old stratum.

On April 15 the most advanced and promising of these were the King, the Alamo and the Martin, and hence any announcement of satisfactory results from either of them will revive interest in the whole district, while a failure of all will be followed by a rapid return of the district to its more peaceful and primitive pursuits of agriculture and fruit raising.

ELECTRIC RAILROADS IN ITALY.—Electric traction as a substitute for steam has been introduced upon about 81 miles of railways in Lombardy, Italy. These lines traverse the picturesque North Italian lake regions, and as the country is mountainous and water power abundant, there are special economic advantages in the use of electric power.

COAL IN ALSACE LORRAINE.—Coal, it is reported, has been discovered near Zimmingen, in Alsace-Lorraine. The coal is of the best quality; the seam was struck at a depth of 740 meters, and is 3 meters in thickness.

NOTE ON THE CONDITION OF NICKEL IN NICKELIFEROUS PYRRHOTITE FROM SUDBURY.

By C. W. DIXON.

The question of the exact relation of nickel to nickeliferous pyrrhotite has long been a disputed one. That the mineral pentlandite [(Ni Fé) S] occurs in the Sudbury deposits is an acknowledged fact, but the general concensus of opinion has been that the larger part of the nickel replaced iron isomorphously in the pyrrhotite.

With the idea of determining the validity of this assumption, the writer performed a number of experiments on the magnetic concentration of some Sudbury ores.

The method and results are briefly as follows:

Pyrrhotite as pure as obtainable was first analyzed for nickel (column 1, table 1). The same samples were then ground to 100 mesh, and the mineral freed from the non-magnetic portion as completely as possible, by repeated treatments with a small horse-shoe magnet.

The magnetic product was then analyzed for nickel (column 2, table 1).

The nickel was found to be materially reduced, and the results seemed to indicate a rather constant quantity remaining with the magnetic part. Further experiments, however, showed that this was purely an accidental relation.

The original samples were in the second experiment coarsely crushed, and the magnetic portion sized between No. 40 and No. 60 mesh. This was freed as well as possible from non-magnetic material, and then crushed between No. 60 and No. 80 mesh and again concentrated. By successive treatments the mineral was finally reduced to a fine powder, with most of the non-magnetic part eliminated. This final product was also analyzed for nickel. (column 3, table 1).

TABLE 1.

	Ni+Co. 1.	Ni+Co. 2.	Ni+Co. 3.	
1. Elsie mine	2.44	2.22	0.98	Fine-grained pyrrhotite.
2. Stobie mine	3.05	2.14	0.68	Fine-grained pyrrhotite.
3. Frood mine	2.40	2.07	1.05	Coarse-grained pyrrhotite.
4. Mount nickel mine	3.06	2.14	0.75	Medium-grained pyrrhotite
5. Copper Cliff No. 2 mine	4.00	2.00	0.70	Fine-grained pyrrhotite.
6. Copper Cliff No. 4 mine	3.30	2.32	0.83	Coarse-grained pyrrhotite.
7. Creighton mine	2.32	2.25	1.20	Coarse-grained pyrrhotite.
8. Gertrude mine	4.00	2.30	1.10	Massive pyrrhotite.
9. Victoria mine	3.40	2.46	0.80	Fine-grained pyrrhotite.

Column 1 is natural pyrrhotite. Column 2 is the magnetic part of 1, separated after crushing to 100 mesh. Column 3, magnetic part of 1 after repeated crushing and separation. Location.

The results show that the nickel has been reduced from between 3 and 4 per cent to between 0.68 and 1.20 per cent.

This indicates that at least a very large proportion of the nickel is present, not as a component part of the pyrrhotite, but as a separate mineral.

In no case was it found possible, by the means employed, to free the pyrrhotite entirely from non-magnetic materials, as the mixture was so intimate that some was always carried over mechanically.

These results are in line with those obtained by Mr. J. N. Judson of the Wetherill Separating Company, who found that certain non-magnetic residues from Sudbury pyrrhotite were very high in nickel.

Analyses of the non-magnetic nickel mineral freed as well as possible from impurities are as indicated in table 2. The results are given after deducting the iron and sulphur necessary to form chalcopyrite with the small amounts of copper present.

TABLE 2.

		Atomic Ratios. S = 7.00				
Location.	Ni+Co.	Fe.	S.	S.	Ni+Co.	Fe.
A. Victoria mines	32.30	27.66	30.96	1.00	0.570	0.514
B. Frood mine	33.09	28.65	32.04	1.00	0.565	0.512
C. Creighton mine	33.00	28.45	*32.80	1.00	0.55	0.50
D. General Sample	30.30	26.40	29.46	1.00	0.565	0.515
E. Copper Cliff (Penfield)	35.08	30.25	33.42	1.00	0.572	0.518

*Sulphur not estimated by the writer. It seems too high.

The analyses agree almost exactly with that of pentlandite, from Copper Cliff (E) examined by Prof. Penfield of Yale (American Journal of Science Volume XLV, 1893, p. 493.)

All the ratios, however, indicate an excess of (Ni +Fe) over S, necessary to form pentlandite of the theoretical composition (Ni Fe)S. The meaning of this excess is not clear, but there seems to be no doubt that the mineral is essentially pentlandite, and that the nickel occurs in this form in all the deposits of the Sudbury District.

TANKAGE CAPACITY OF BEAUMONT OIL FIELD.

SPECIAL CORRESPONDENCE.

The question of the cost and method of construction of earthern or underground tankage and its practicability is at present one of the most discussed problems in the Beaumont field. The following statement shows the reservoirs or tanks already completed and under construction, their estimated capacity and cost, their method of construction and the quantity of oil stored therein March 31st. It shows that while the capacity of completed tanks or reservoirs is 600,000 barrels, they contain only 145,000 barrels. Such tanks vary in cost from 2½ or 2¾ cents per barrel to 13 cents per barrel, the difference being due to the methods of construction. The reservoirs may be divided into three classes and their practicability inquired into separately.

First. The bare earthern reservoir formed by the bottom clay and the embankment thrown up, unlined and uncovered, having a water bottom; this kind of tank can be built for 2½ to 3 cents per barrel, and the greatest diversity of opinion prevails as to its adaptability. It is claimed by some that while the seepage is considerable at first, it gradually stops when the sediment from the crude oil permeates the clay, forming a sort of cement. This can only be demonstrated by time, for it is certain that considerable seepage has taken place from the only reservoir of this kind into which oil has been pumped and the embankment above ground seems saturated with oil in many places. A thorough test with a very carefully constructed reservoir having well puddled and tamped sides would be of value. The question of evaporation as well as seepage is important. At present the current opinion is that tanks or reservoirs of this description, while cheap, are wasteful, and the undetermined questions as to loss by evaporation and seepage make them a doubtful proposition.

The completed tankage of this class mounts to 285,000 barrels, and the uncompleted to 600,000 barrels.

Second. Tanks formed by the natural clay and embankments with sides puddled and tamped, free from roots, grass and stumps, having a water bottom and covered with a wooden roof.

No tanks of this character are yet completed. They cost about 8 or 9 cents per barrel capacity. In figuring the cost it must be taken into consideration that in case the thrown up embankment does not hold oil properly, thus preventing the filling of the tank to its capacity, the cost of tankage per barrel will be greatly increased. A test was made of a small tank carefully constructed, puddled, and covered, and accurate measurements and records kept; the result showed a loss of 20 per cent of the oil in 10 days. If this loss be a correct gauge for a longer period a tank of this description would hardly be a safe or a profitable investment.

The third class cannot strictly be called earthern reservoirs being rather underground wooden tanks. The earth is carefully banked, 4-inch square uprights sheeted with two thicknesses of matched lumber free from knots lining the sides. The sides are also carefully puddled and tamped. The tanks have a water bottom and a matched lumber roof painted with tar. The embankment is twenty (20) feet broad at the top and carefully finished. There is no evidence of any seepage, and the oil being underground and covered with wood should be cooler and less liable to evaporation than when stored in iron tanks. In any event they are far superior to mere earthern tanks and their cost is about 13 cents per barrel capacity or about half that of the iron tanks.

Such is briefy the present condition of earthern tankage—future construction will benefit by the experiments now being conducted.

Statement of the Earthern Tanks in the Vicinity of Beaumont.

Owner and Situation.	Capacity. Bbls.	Oil in Tanks. Bbls.
1. German-American Oil Co., near Spindletop	85,000	40,000
2. Tri City Oil Co	100,000	....
3. Apex Oil Co., Vitaboe	100,000	....
4. Sun Company, Sun Station	105,000	105,000
5. Sun Company, Sun Station	210,000	....
Totals	600,000	145,000

No. 1. Scraped out, not puddled, water bottom, not covered. It leaked, but is now claimed to be holding.
2. Scraped cut, same as No. 1, water bottom, not in use.
No. 3. Same as No. 1 and 2—water bottom, not in use.
Nos. 4 and 5. Scraped out, 4-inch square uprights, set 2 feet apart. Sides are of two layers an inch thick—matched lumber, sides puddled, matched lumber top carefully built in every detail.

In addition to the tanks which have been already completed, there were six others in course of construction on March 31. These are as follows:

One tank of 50,000 barrels capacity on Spindletop, pipes now being under construction by the Victor Oil Company. This has been roughly scraped up, is to be uncovered, and is about half completed.

The Babbitt Syndicate is constructing an earthen tank, estimated capacity 100,000 barrels; wooden box pipes to carry the waste oil from the field to tank are being laid. This tank is to be constructed near the Kansas City Southern Railroad Company on Spindletop.

The Texas Fuel Company has under construction an earthen tank of 100,000 barrels capacity, near the line of the Kansas City Southern Railroad. This tank is to have its sides boarded with one thickness of unmatched lumber covered with tar paper.

M. L. Lockwood of the Sabine Oil and Marketing Company has, half finished, a 300,000-barrel tank, which is to have sides of puddled clay and will be covered with a wooden roof.

The Equitable Oil Company has just begun a tank of 50,000 barrels capacity near Spindletop, and the Sun Company is constructing a third tank with a capacity of 210,000 barrels. It is constructed on lines similar to numbers 1 and 2, of the same company. The estimated cost of the completed and uncompleted tanks is shown in the following table:

Recapitulation.

Five completed tanks; capacity 600,000 bbls., containing 145,000 bbls.	
Cost of Nos. 1, 2 and 3 excavations, 2¾c. bbl.	7,837
Cost of Nos. 4 and 5 of Sun Co. which are tamped, lined, covered and carefully constructed at 13c. bbl.	41,150
Estimated cost of completed tanks	$48,987
Six unfinished tanks with a capacity of 1,210,000 bbls.	
No. 1 Cost of labor and material at rate of 2¾c. per bbl.	$688
No. 2 Cost of labor and material at rate of 2¾c. per bbl.	6,875
No. 3 Cost of labor and material at rate of 8c. per bbl.	4,000
No. 4 Cost of labor and material at rate of 9c. per bbl.	15,000
No. 5 Cost of labor and material at rate of 2¾c. per bbl.	250
No. 6 Cost of labor and material at rate of 13c. per bbl.	28,000
Cost of uncompleted tanks	$44,813
Total amount spent to date	$93,800

The total estimated oil in tanks of all descriptions in Beaumont and vicinity on March 31, 1902, was: Iron, 4,800,000 barrels; wood, 50,000 barrels; earth, 145,000 barrels; total, 4,995,000 barrels.

MORTALITY IN IRON AND STEEL WORKS.—Referring to the *Directory* of iron and steel works just issued by the American Iron and Steel Association, the *Bulletin* of the Association says: "The list of iron and steel works that have been abandoned or dismantled since the appearance of the *Directory* of 1898, or that have since that year become inactive, will not be overlooked. This graveyard list occupies 17 pages. It embraces 61 furnaces, 118 rolling mills, Bessemer steel plants, open hearth steel plants, crucible steel plants and plants equipped for the manufacture of steel by special processes, and 5 forges and bloomaries. Very few of these plants will ever again have their fires started. Practically all of them are dead for all time. This mortality list is the largest we have ever compiled for the same period of time, less than four years."

CHARACTER AND STRATIGRAPHICAL PECULIARITIES OF THE SOUTHWESTERN IOWA COAL FIELDS.

BY CHARLES R. KEYES.

On account of its location so far beyond the borders of the main coal-producing belt of the Trans-Mississippian region, and, therefore, because it is so much nearer to a vast territory which has no fuel supply of its own, unusual interest has been attached of late to the coal-mining developments of southwestern Iowa and the adjacent portions of Missouri and Nebraska. The productive extent and possible limitations of the field have been generally misunderstood. In consequence, prospecting and subsequent developments have not been usually carried on so profitably or so vigorously as the field really warrants.

Until quite recently, it has been supposed that the coal horizons in this field were a westward extension of those farther eastward, in the states of Iowa, Missouri and Illinois. It is now known that the southwestern Iowa coals are very much higher, stratigraphically, than any of the other Iowa seams. They belong to the Atchison shales division of what is now generally called the Missourian series, and in the upper part of it; while eastern Iowa coals belong to the lower portion of the main coal-bearing formations of the region, known to the geologists as the Des Moines series. The two horizons are separated by a stratigraphical interval of more than 1,200 feet.

Contrary to the general opinion held by mining men, the most important coal-bearing formation in southwestern Iowa is far below the level of the coals now worked. Shafts 1,200 to 1,400 feet would be required to reach these lower coals, and the horizons which furnish the main coal supplies of the States mentioned. These depths are not, however, excessive or prohibitory. At Leavenworth, Kansas, these lower coals are extensively mined, the shafts being 800 to 1,000 feet in depth. At that point, also, nearly the same great sequence of barren formations as is found in the southwestern Iowa field is passed through before the coal can be reached.

The main coal seam of the southwestern Iowa District is called the Nodaway coal. It seldom attains a thickness of more than 3 feet. Usually it is considerably thinner than this. Its peculiar stratigraphic relations and its location so much nearer a market which must be supplied by coal from distant points makes the seam of special value. In localities more favored with several seams of coal, and seams of greater thickness, it might long remain unexploited.

Compared with most other coals of the Trans-Mississippian region, the Nodaway coal has a wide areal extent. In workable thickness it occupies about 2,000 square miles; and the horizon is recognizable over as many more.

The stratigraphical position of the Nodaway coal is of great interest. The seam lies 75 to 100 feet above the base of the Atchison shales, which are about 500 feet in thickness, but of which not more than 300 feet are represented in Iowa. The Atchison shales rest on the Forbes limestone, which attains a maximum thickness of 30 feet. Farther south, in Missouri, the Forbes formation crops out near the base of the stream bluffs, and the coal is exposed high up in the hills.

The Atchison terrane forms an enormous bed of soft clayey shales, having a development as great as the entire main coal-bearing series of Iowa and Missouri. It owes its preservation to its occupation of a remarkable trough, which has carried down the coal seam below the level of the present grade of the streams traversing the region. In the general reduction of the country to a grade-plain through erosion, the soft non-resistant shales have been worn down much more rapidly than the hard limestones on either side of the broad syncline. A noteworthy feature in the general surface relief of the country is thus produced. It is a wide basin with rather abruptly rising margins. This marked topographic feature has been called the Maryville lowland plain and well merits special designation.

The main coal seam of the field crops out along both branches of the Nodaway River and many of their tributaries. At many points in the upland it is reached by shafts of which none are more than 100 feet in depth. Towards the south, beyond the Iowa-Missouri boundary, the seam rises until it is more than 100 feet above the water-level of the streams. Everywhere the coal is easily accessible, and presents no difficulties to mining. A few faults are known, but they are of very small throw, the greatest being not over 15 inches.

The following are some of the analyses of the Nodaway coal, made by the Iowa and Missouri geological surveys:

Location.	Moisture.	Total combustibles.	Ash.	Volatile combustible.	Fixed carbon.	Coke.	Sulphur.
Briscoe	8.97	80.48	10.55	36.44	44.04	54.59	3.26
Carbon	9.12	81.51	9.36	35.71	45.79	55.12	4.07
Eureka	8.68	81.91	9.70	33.85	47.72	57.43	4.58
New Market..	8.06	80.57	11.36	34.99	45.58	56.95	5.17
Quitman	3.53	83.43	13.04	42.72	41.71	53.75	...
Niagara Cr....	8.94	80.13	10.93	34.75	45.38	56.31	...

STABILITY TESTS FOR SMOKELESS POWDER AND NITRO EXPLOSIVES.*

BY T. ASPINWALD.

One of the most important problems to be solved by chemists engaged in the manufacture and examination of smokeless powder and nitro explosives, is the development of a standard chemical test, by means of which, within a reasonably short space of time, the stability of such substances can be determined reliably and with reasonable accuracy.

Both to the manufacturer and to the consumer the question is one of the greatest importance. The consumer must be assured that the substance, having satisfactorily passed the prescribed test, no doubt should exist as to its stability and keeping qualities; the manufacturer must also be protected, in so far that he should not be rendered liable to losses caused by the rejection of an explosive, due to the application of an unreliable or an erratic test.

It is a matter of great importance that a conclusive test shall be developed, by means of which, within a few hours, or even a few days, results can be obtained that shall determine with reasonable accuracy whether an explosive may be considered stable or not.

None of the tests now employed can be considered as affording reliable evidence as to the stability or instability of an explosive; while they are all more or less crude and inaccurate, they are empirical, and the results obtained depend to a great extent upon the personal equation of the operator.

In very many instances widely varying results have been obtained upon the same sample by two or more operators.

The best known test used for the determination of the stability of nitro explosives is the potassium-iodide starch test, which has been fully described in various text books and specifications.

Mr. Aspinwall mentioned the tests required by different governments and the comments by different investigators on the subject.

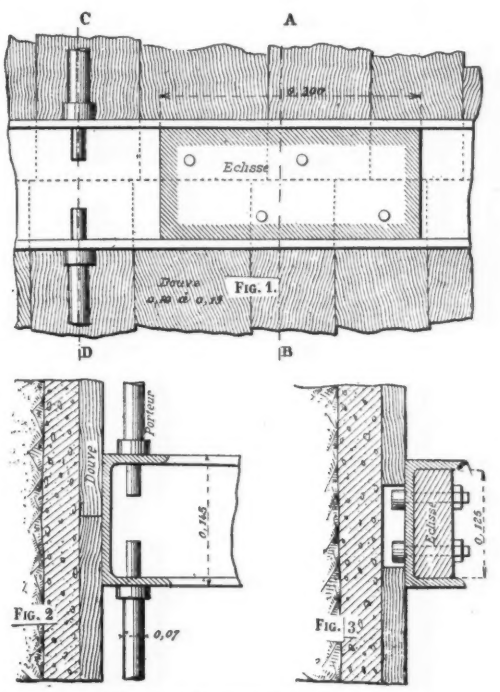
*Abstract of a paper read before the New York Section, Society of Chemical Industry.

NATURAL GAS IN IRON AND STEEL WORKS.—Contrary to the general impression the *Directory* just issued by the American Iron and Steel Association shows that a larger number of iron and steel plants were using natural gas in 1901 than in 1898, the exact number in November, 1901, being 110, with 7 additional natural gas plants in course of erection, against 94 plants using natural gas in June, 1898, and 2 in course of erection. The number of plants using natural gas in 1901 was larger than has been noted in any previous edition of the *Directory*, the nearest approach to it being 104 plants in 1889.

STEEL BRACES FOR SHAFT LINING.

In consequence of an accident to a portion of a shaft which was not lined with masonry, occurring at the colliery of Couchant le Flenn, in Belgium, the Mines Administration has directed the placing of metallic bracing in the shaft. This bracing, which is shown in the accompanying illustrations is described in the *Annales de Belgique* of recent date.

The first metallic brace rests on the masonry of the circular shaft, at a depth of 486 meters. Fig. 1 shows a part of the lining, while Figs. 2 and 3 are sections, showing, respectively, the bolt connections, and the joint and key. The braces are U-shaped girders, of steel, each being made in six segments, joined by keys. They are placed from 0.80 to 1.20 meters apart in the shaft, the average diameter of which is 3 meters. The segments are joined by bolts. Each brace is connected with the next one by 12 bolts—2 to each segment—of 27 millimeters diameter. The shaft lining itself is composed of oak planks, 25



LINING FOR COLLIERY SHAFT.

to 30 millimeters thick and 10 to 15 centimeters wide, carefully joined. The interval between this plank lining and the rock is filled with a concrete compound of 1 part of hydraulic cement, 1 part of cinders, and 2 parts of broken bricks.

The cost of each ring or brace, including the planking, 1 cubic meter of concrete and the labor of setting, etc., was $44.75. This was approximately the total cost of the lining per running meter. As the shaft had to be lined for 300 meters, the total cost was about $13,500. The lining showed one advantage, that the work could be very quickly done.

MICA MINING IN INDIA.—The tying up of claims seems to be an evil felt in India as well as here. *Indian Engineering* says that owing to the absence of restrictions as to the status and reputation of applicants for mining leases, there had sprung up in the Nellore District a class of speculators who applied for mica plots without any idea of seriously working them, but with the object of subsequently transferring them for consideration, perhaps after digging a pit and exposing a few mica heads. The operations of the *bonâ fide* workers were much impeded by these speculative applicants who were chiefly men of straw, and with a view to discourage such speculation the Madras Board of Revenue has amended the mica rules by laying it down that applications for mica mining leases should be accompanied by a deposit of 500 rupees, or such sum as the Government might fix. This is in conformity with the the mining rules of the Government of India.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

OPERATOR OF MINE IS REQUIRED ONLY TO USE KNOWN DEVICES.—A trial court commits error, which will set aside a verdict, where it submits to the jury the question of whether an operator could "by any other device" than the one it had to use, have prevented an injury, since such question does not confine the jury to known devices, but calls on them to decide whether a more effective device could be invented.—Harvey v. Susquehanna Coal Company. (50 *Atlantic Reporter*, 770); Supreme Court of Pennsylvania.

WHAT CONSTITUTES ABANDONMENT OF OIL LEASE.—The lessees under an oil lease for "fifteen years, and as much longer as oil and gas are found in paying quantities" erected a rig and drilled a test well on the premises, but obtained no oil, whereupon they removed the machinery used in drilling, leaving nothing but a tank, which was allowed to rot, and asserted no title until nine years afterwards, when other lessees found oil in paying quantities. It was held that the first lessees had abandoned their lease, so as to entitle subsequent lessees to the premises.—Calhoon v. Neely (50 *Atlantic Reporter*, 967); Supreme Court of Pennsylvania.

RIGHTS UNDER OFFER AND ACCEPTANCE.—A mining company having purchased certain machinery and finding itself insolvent, proposed to the seller to return the machinery in satisfaction of the debt. Pending negotiations the machinery was loaned to a third company. Letters passed between the director of the insolvent company, authorized by a resolution of the board of directors to consummate the deal, and the agent of the seller, and these showed that the seller accepted the proposition, and that its agent notified the company that had borrowed the machinery that the seller claimed the property. The selling company also telegraphed the borrower to hold the property for it—the seller. It was held that the evidence showed a sale from the insolvent company to the original seller, based on a valuable consideration, sufficient to vest title in it as against other creditors who subsequently attached this machinery.—Hendrie & Bolthoff Manufacturing Company v. Collins (67 *Pacific Reporter* 104); Supreme Court of Colorado.

SUSPENSION OF DELIVERIES OF COKE ON ACCOUNT OF STRIKE.—A provision in a contract for the purchase of all the coke manufactured by the seller during a fixed period (the latter guarantying a fixed amount; that in case of strikes, accidents, or other causes causing the stoppage of the works of the seller, deliveries under the contract may be "suspended") relieves the seller from the obligation of its guaranty, where such causes have prevented it from furnishing the guarantied amount during the specified time, for the word suspended does not mean postponed, and therefore the purchaser cannot demand delivery of coke to make up the deficiency, after the expiration of the period so fixed.

A provision that the usual strike clause shall mutually govern in a contract for the purchase of all the coke manufactured by the seller during a fixed period, the price, the time of payment and quality being agreed upon, qualifies only the guaranties that the purchaser will take all the coke manufactured and that the seller will furnish a specified amount during such period. Where a buyer in a contract for weekly shipments failed to pay on the 20th of the month for the coke received during the preceding month, as required by the terms of the contract, the seller might repudiate the contract, not being himself in default. The terms of the contract are not changed by the buyer sending to the sellers orders for coke in excess of the specified amount, where such orders are received in due course of business, but are not accepted.—Hull Coal & Coke Company v. Empire Coal & Coke Company (113 *Federal Reporter*, 257); United States Circuit Court of Appeals.

ABSTRACTS OF OFFICIAL REPORTS.

Aetna Consolidated Quicksilver Mining Company, California.

This company's statement for the year 1901 shows receipts as follows: Sales of quicksilver, $10,290; interest, $1,946; total, $12,236. The expenses were $27,809; decrease in supplies, $2,845; total, $30,654, leaving a deficit of $18,418 for the year. The balance brought forward from previous year was $79,129; balance at the close of the year, $60,711. During the year the sum of $14,620 was expended for development and included in expenses.

Utah Consolidated Gold Mines, Limited.

This company is an English corporation, having a capital of £300,000. It owns practically all the stock —$249,000—of the Highland Boy Gold Mining Company, which operates the Highland Boy Mine in Utah. The report is for the year ending December 31, 1901. The income account of the English company shows: Dividends on Highland Boy stock received, £163,195; interest, etc., £199; total, £163,394. The payments were: General expenses, taxes, adjustments, etc., £13,394; dividends paid—£38,109 to English and £111,891 to American stockholders—£150,000; total, £163,394.

The profit and loss account of the Highland Boy, the American company shows: Balance from 1900 after paying $800,000 dividends for that year, $75,318; profit for 1901, as shown below, $632,484; total, $707,802. From this are deducted payments for new properties, $25,000; payment to Samuel Newhouse, $33,333; total, $58,333, leaving a balance of $649,469 at the close of the year.

The operating account for the year, with the averages on the basis of 166,343 tons of ore mined, were as follows:

	Total.	Per ton.
Sales of metal	$1,598,362	$9.61
Increase in stocks on hand	344,852	2.07
Rents, etc	1,380	0.01
Total receipts	$1,944,594	$11.69
Mining expenses	$314,236	$1.89
Development and maintenance	29,075	0.18
Smelting expenses	501,135	3.01
Matte and ore purchases	242,868	1.46
Freight, refining, storage, etc	180,960	1.09
General expenses, interest, etc	43,836	0.26
Total expenses	$1,312,110	$7.89
Balance, profit	$632,484	$3.80

The smelter report shows that the amount of material treated during the year was 167,823 tons copper ore; 109 tons oxidized ore; 15 tons custom ore; 1,651 tons Bingham matte; a total of 169,598 tons, from which there was produced 10,353,543 pounds of copper bullion. The custom ore was used in lining converters to replace an equal amount of barren silica. A charge is available for treating this material, and a slight revenue was derived therefrom. The new furnaces were all in commission on February 1, 1901. For the succeeding 11 months the smelter averaged 480 tons ore treated per 24 hours. The new McDougal roasting plant has proved very satisfactory, and the expectation of reduced costs have been fully realized. After operating the new roasting furnaces for a short time, it was found to be necessary to supply them with more fresh water than had originally been calculated on, and for that reason a new power pump with duplicate set of electric motors was installed. One additional electric tram car was added to the service during the year. It is now proposed to install a small belt-driven air compressor, to supply air at high pressure, to operate a pneumatic rammer for tamping the linings in the converter shells, and also to drive a few pneumatic tools. Considerable saving of labor is to be expected from this.

The total quantity of metals produced is stated as follows:

	Co.'s ore.	Bingham matte.	Totals.
Gold, fine ounces	13,983	2,931	16,914
Silver, fine ounces	176,331	100,068	276,399
Copper, pounds	9,043,967	1,041,801	10,085,768

The average yield of the company"s ore was 0.08 ounce gold and 1.05 ounces silver to the ton, and 2.7 per cent copper. The average prices obtained were, for copper, 16.34 cents per pound; silver, 56.94 cents per ounce. In addition to the ore smelted, 86 tons of lead ore were mined and sold.

Respecting mine development Manager R. H. Channing, Jr., says: "Development work has been pushed continuously by drifts, cross-cuts, shafts and raises, and over 4,000 feet of new ground has been opened in this way during the year. The most important result has been the discovery of a new ore body in No. 7 tunnel level, lying about 200 feet east of No. 1. The extension of this was first encountered in the tunnel itself, where it showed as iron pyrites carrying only fractional percentages of copper. Cross-cutting to the north and west led into ore of higher grade, and the shoot has now been opened up by means of drifts and raises so that we have in sight 75,000 tons, all of smelting grade. The limits of the shoot on this tunnel have not as yet been fully defined, nor has any work been done as yet below the tunnel level. Another ore shoot was opened on No. 5 tunnel level, but its extent proved disappointing. A two compartment shaft has been sunk 100 feet below No. 7 tunnel in the hanging wall, in line with the extension of No. 1 ore shoot, to what will be designated in the future as No. 8 level, and a little over 100 feet of cross-cutting has been done from it, at present without favorable returns. I have no doubt, however, that future work will develop our ore bodies on that level, but to avoid unnecessary expense, work has been temporarily suspended there, pending results from the drifting and cross-cutting in ore now being done on 7½ level, 50 feet above. No. 2 ore shoot has been opened up on No. 7 tunnel and connection nearly completed with No. 6 tunnel, showing a continuous ore body, and while the area of this ore body between these levels has not been fully determined, all indications points to the shoot maintaining the size it showed in upper workings. We have drifted west from No. 13½ cross-cut on No. 4 tunnel level for 547 feet without finding any ore. No work has been done on the Yampa Extension, Keepapitchinin and Rattlesnake claims acquired by the company last year. The operators of the Yampa property are at present driving a long tunnel to open up their ground, which will give a great deal of information bearing on our above claims, so that I think it advisable to defer work on them until this tunnel is completed.

"I estimate 950,000 tons of sulphide ore in sight. In this no allowance is made for ore not fully proven. Comparing the above with estimate given in last annual report, this shows a gain of 90,000 tons of ore in sight. A greater new tonnage than this would indicate has actually been opened up, but on account of No. 5½ level, which is midway between 5 and 6 levels, not showing on present developments, an area equal to the mean of the areas shown on the latter two tunnels, which mean was taken as a basis for calculating this block of ground last year, the estimated tonnage in this block has been reduced, thus cutting down the net gain in total ore reserves to the figures above noted."

The president's report says: "During the year the company acquired by purchase the Yampa Extension, Keepapitchinin and Rattlesnake claims, it being important that the company should own these properties, as its large existing ore body undoubtedly extends underneath them. It is intended to develop the ore under these claims by means of a tunnel, to be called No. 8 tunnel, which will be driven at a level of about 100 below No. 7 tunnel. The company also acquired 12 acres of ground at the smelter site, which will be required later for the purpose of dumping slag, also a strip of land at Bingham for tramway terminal. The company having reverberatory furnace and converter capacity in excess of its roasting capacity, undertook the treatment of 200 tons per month of the matte of the Bingham Copper and Gold Mining Company. This contract, while it has yielded a small profit to the company, will be discontinued in a month or two, when the Bingham Company will have its own converter plant in operation. The event of paramount importance to all copper producing companies during the year was the sharp decline in price of the metal in the month of December. When the reduc-

tion in the price of copper occurred, the company had approximately 1,500,000 pounds of refined copper on hand, and 2,500,000 pounds in transit and in process of refining. The average price realized by the company for its product since it began operations in May, 1899, to the end of last year, was 15.31 cents per pound."

New Home Mining Company, Leadville, Colorado.

The annual report of the New Home Mining Company of Leadville presents facts of much interest, of which the following are of special note:

The total receipts from all sources from April 1, 1901, to the end of the year, amount to $338,184. Of this amount, $301,593 came from the sale of 81,776 tons of ore, making the average price per ton of ore received by the company for all ore mined and sold $3.68. The total expenses of the company for the time mentioned, exclusive of dividends, amounted to $224,021, making the cost of mining and marketing a ton of ore, including all expenses, $2.74, which shows a net profit to the company of 94 cents on each ton of ore sold. During the time mentioned nine dividends were paid, amounting to $122,500.

Development work to the extent of 10,655 feet was done and 1,520 feet of diamond-drill exploration. Deducting the amount which has been spent for development work from the total expenses of the company, including salaries, general expenses, office expenses, insurance, taxes and pumping expenses, the actual cost of mining and marketing a ton of ore was $1.44. The average number of men on the pay roll was 170 per month, the average pay roll $12,783, and the average total expenses per month $20,161. In the present instance there appears to be abundant evidence of a heavy reserve on which to draw in future operations.

The officers of the company for the ensuing year are the following, with headquarters in Leadville: President, John M. Maxwell; vice president, William K. Burchinell; treasurer, Edward J. McCarty; secretary, Warren J. Moore; manager, Andrew Dyatt; other directors, Dr. John Law, D. D. Sullivan, Henry Gaw and Arthur Lumsden.

BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sake and for that of book buyers, give the retail prices. These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.

Western Australia Statistical Register for 1900. *Part* 5. Compiled in the Register-General's Office, Perth, W. A.; Government Printer. Pages, 80.

Jahrbuch fur das Eisenhuettenwesen. 1900. Compiled by Otto Vogel. Düsseldorf, Germany; A. Bagel. Pages, 464; illustrated. Price (in New York), $3.50.

Les Charbons Americanis. Production et Prix. Havage et Roulage Mecaniques. By Ed Loze, Paris, France; Veuve Ch. Dunod. Pages, 150; illustrated.

Thirty-second Annual Report of the Board of Directors of City Trusts of the City of Philadelphia. Philadelphia; printed for the City. Pages, 244.

Theory of Steel-concrete Arches and of Vaulted Structures. Second Edition, Revised; 1902. By Prof. William Cain. New York; the D. Van Nostrand Company. Pages, 182; illustrated. Price, 50 cents.

BOOKS REVIEWED.

The Cyanide Process in the Black Hills of South Dakota. Bulletin No. 5, South Dakota School of Mines. By Charles H. Fulton, Rapid City, South Dakota; published by the School. Pages, 88; illustrated.

The cyanide process has been very extensively applied during the past two or three years to the ores of the Black Hills district in South Dakota. To many of these ores it has been found especially adapted, and its use has resulted in the profitable working of a number of mines which had been neglected or even abandoned when other methods of treatment were tried. Some data on the use of this process were given in THE ENGINEERING AND MINING JOURNAL, January 4, 1901. In Mr. Fulton's monograph more details are given than was possible in the space which could be given in our columns. It will be found of much interest to those who are concerned in Black Hills, and also to those who are watching the developments of the cyanide process and the extension of its use. It is one of the series of *Bulletins* which are prepared by the South Dakota School of Mines; a series which promises to be of much service to the mining interests of the State.

State of Michigan: Nineteenth Annual Report of the Bureau of Labor and Industrial Statistics. 1901. Scott Griswold, Commissioner of Labor. Lansing, Mich.; State Printers. Pages, 540.

This report contains a great deal of information as to the varied industries of Michigan, including labor, wages and other points bearing upon them. The chapters of special interest to us treat of the portland cement industry and of the coal mines. Little is said of the iron and copper mines, which are treated in a separate report, that of the Commissioner of Mineral Statistics. The cement industry is of recent origin and has grown very rapidly in the State; while a great development of the coal mining industry has also been manifest in recent years, as shown in this volume.

Locomotive Sparks. By Prof. W. F. M. Goss, New York; John Wiley & Sons. London; Chapman & Hall, Limited. Pages, 180; illustrated. Price, $2.

The sparks thrown out from the smokestacks of locomotives constitute an appreciable proportion of the fuel losses, besides being in some cases a source of damage and loss. In this volume records are given of careful studies and experiments intended to show the amount of the loss and the possibilities of reducing it. It treats in succession of the conditions affecting furnace action in a locomotive; of the production of cinders and sparks; of spark prevention; of the action of the exhaust; of the spread of sparks after they leave the stack; and of chances of fire from sparks.

An appendix describes the locomotive testing plant at Purdue University. Under the direction of Prof. Goss this plant has done much valuable testing and experimental work; a small part of which is recorded in the present book.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so required.
Letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

Discrepancies in Cyanide Operations.

Sir: In a recent number of the ENGINEERING AND MINING JOURNAL, a subscriber inquires why the bullion returns do not equal the returns as indicated by assays. As he stated no particulars of the method used in his work, it would be well nigh impossible to tell just where his trouble is, but the following may aid in this direction.

1. Inaccuracy in estimating actual tonnage leached. If slimes and sands were not well mixed and disintegrated, the slimes would hold considerable values in solution, after draining, as well as being of practically the same value as before.

2. Inaccuracy in estimating moisture. All solution remaining in tanks at time of finish of operations contains more or less gold value.

3. The sands not evenly leached. The top of a tank of sand is nearly always better leached than the portion nearest the filter. An assay of each succeeding foot from the top to the bottom will often show surprising values retained in the vat at finish of operations; whereas a core sample reaching the entire distance will show a good average extraction.

4. Leakage of tanks, valves and zinc boxes. This is often great, especially at the begininng of operations, and with new vats and solution tanks there may be considerable loss by absorption.

5. Loss during clean up of gold slimes and melting into bullion. This is often due to lack of facilities and conveniences for transferring the slimes from the extractor boxes to the drying pans or to the acid tank. If treated by acid and a complete solution is not effected, it will often cause considerable value to remain in the slag. If treated by roasting, with or without nitre, it is almost impossible to prevent a loss by dusting in removing from pans and while placing in the crucible.

6. The value remaining in the slag after melting the slimes is often overlooked, and may be of considerable value if the heat has been too low or the flux too thick to pour easily. The proper flux, in an individual case, can only be determined by trial.

7. Value remaining in coarse zinc at close of operations.

8. Value remaining in stock solution, but not precipitated, at close of operations.

W. S. MANN.

Miramar, Costa Rica, April 15, 1902.

A Laboratory of Engineering Research.

Sir: It is gratifying to read in the letter of Prof. Thurston, in your issue of April 19, that the suggestion in the editorial on "A Laboratory of Engineering Research," in your issue of April 5, that an advisory committee of engineers should be formed to co-operate with the trustees of the Carnegie Institution, has been anticipated, and that the committee is to consist of such distinguished engineers as Messrs. Burr, Gibbs, Morison, Steinmetz and Thurston. No better men could be selected to represent the particular branches of engineering in which they are specialists. It is worthy of note also that in the constitution of this committee recognition has been made of the fact that in engineering science and art the leading men are not all college professors. Mr. Gibbs is consulting engineer to the Baldwin Locomotive Works, Mr. Morison is a civil engineer in office practice, and Mr. Steinmetz, who is president of the American Society of Electrical Engineers, is connected with the General Electric Company. Only two of the five men are college professors. Professor Burr is head of the department of civil engineering in Columbia University, and Prof. Thurston is director of the Sibley College of Mechanical Engineering in Cornell University.

I venture to suggest, however, that the committee as at present constituted does not represent all the branches of engineering which are in need of scientific research, and that it might be improved by the addition of a few more names. It seems, in fact, a little top heavy on the side of civil engineering, a branch in which there is perhaps less need of laboratory research than any other, Prof. Burr and Mr. Morison both being civil engineers with the same specialties. Railway motive power is well represented by Mr. Gibbs, steam engineering by Prof. Thurston, and electrical engineering by Mr. Steinmetz, but there is no representative of hydraulic, mining, metallurgical, electro-metallurgical, chemical, sanitary or marine engineering. The scientific problems waiting to be solved in these several branches are legion, and the foundation of the Carnegie Institution offers a magnificent opportunity for making a systematic beginning of their solution.

METALLURGIST.

New York, May 5, 1902.

The Sudbury Nickel Mines.

Sir: Your explanatory note in the ENGINEERING AND MINING JOURNAL of April 19 about the nickel mines and properties of the Sudbury District outside of the holdings of the Nickel Combination hardly puts the matter quite right. But this is not to be wondered at, as no one who has not actually seen these ore deposits can form any adequate conception of their peculiar mode of occurrence. The writer had to urge upon the late Mr. R. P. Rothwell to visit the district and see for himself that there was no re-

semblance nor parallel between them and regular vein mines.

The Nickel Combination owns altogether 11 of the Sudbury ore bodies, that are recognized as of workable character, and also a number of scattered prospects in different parts of the district. One of these deposits is the king mine of the whole nickel belt, being an enormous body of high-grade ore. Two of the others are also very large, but one of the two is low-grade ore and no development work has been done on the other yet. The rest of the properties of the combination are of the ordinary kind, and no better than the general run of ore bodies in the district in any way. The Copper Cliff was a fine little mine, but is apparently pretty well worked out.

Then, on the other hand, the holdings of various other companies and private owners on the main nickel range are nearly of equal number and comprise the folowing list: The Miller property, large, and of medium grade; the Worthington Mine, small, but of exceedingly high grade; the Victoria Mine (Mond Nickel Company), above the average in size and grade; the Gertrude Mine (Lake Superior Power Company), with three ore bodies of high grade; the "North Star" Mine, adjoining the great Creighton, or king mine of the nickel combination, and of the same high grade; the Elsie Mine, medium in size and grade; the Murray Mine, a fine, compact, massive body of lowish grade ore; the Mount Nickel Mine, of fair size and good paying grade; the Cryderman Mine, with a large outcrop of medium grade ore. This makes nine in all, and except two properties, they are fully as convenient for working as the mines of the Combination, being right beside railway lines. In addition to the above list, there are four deposits of various sizes and grades in the township of Levack still unsold, and about a dozen good properties on the North Range, including one immense body of fairly good ore.

As to the value of these mines and ore deposits—not "areas," as you wrongly call them—owned by outside companies and others not being ascertained, there is just as much known about them as about the properties of the Nickel Combination, for the Canadian Copper Company, whose holdings alone the Combination has so far bought out, never did any development work on a property before buying it, except to put in a shot or two to get samples from the surface outcrop in order to find out the grade of the ore. And yet it is a well-known fact that by such a simple method and with only a local prospector for expert this company made fewer mistakes in buying nickel mines than some other companies in the district have made after going to the trouble and expense of testing properties in the usual way.

In short, nature has developed the Sudbury nickel mines to a large extent, but practical local knowledge is required to tell the distinction between a deep mine and a mere pocket of ore. A. McCHARLES.

Sudbury, Ont., April 28, 1902.

QUESTIONS AND ANSWERS.

(Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preferences will, of course, always be given to questions submitted by subscribers.

Acme Concentrator.—Will you kindly inform me if there has ever been an ore concentrator in the market called the "Acme," and if so will you give the maker's address, and greatly oblige.—F. T.

Answer.—We believe that the word "acme" has been used as a title for a concentrator. We are not able, however, to locate it at the present time. Perhaps some of our readers know of a concentrator so called.

Use of Carbonic Acid Gas from Lime-Kilns.—In your issue of March 29, the editor in a foot note to the paragraph on "Use of Carbon Dioxide from Lime Kilns," says, "The use of carbonic acid gas from lime-kilns is also practiced in the Hargreaves-Bird works at Middlewich, England." Will you kindly state to what use it is put and how?—H. D. D.

Answer.—The gas from the lime-kilns at the Hargreaves-Bird Works is used in the cathode chambers, in which a supply of steam and carbonic acid gas is necessary in carrying out the process.

Cerium, Yttrium and Lauthanum.—Referring to a recent article speaking of the scarcity of certain minerals used in manufacture of Welsbach mantles, will you kindly inform me what (if anything) would be the value in large quantities of an ore containing about 20 per cent of cerium (in N. Y.). Also whether yttrium and lanthanum have any value or use.—H. D. P.

Answer.—We are informed by buyers that cerium oxide by itself or other salts of cerium have no special value. The thorium oxide is the active element in the mantels, in which only one part of cerium is used to 10 of thorium oxide. Yttrium and lanthanum have at present no special uses, and consequently no commercial value.

Thorium and Cerium.—In an article on the "rare earths" (by a specialist), it is said that thorium oxide is alone used by the Welsbach light people for their mantels. In one of the United States Consular reports, it is stated that not only thoria, but the oxides of cerium and some of the other earths, are used in the mantels. Which is right?

2. What is the price of the oxides of thorium, cerium and zirconium? You quote only the nitrates.

3. Has any use been found, so far, for tantalum and niobium oxides. If so, is there any demand for them. What are they worth in N. Y.?—E. L. F.

Answer.—The first article you quote is substantially correct. As stated elsewhere in this column, thorium oxide is the active element in the mantles. Cerium oxide is used, but only in the proportion of about 1 to 10 of the thorium oxide. The different impression probably arose from the fact that the cerium salts and the other rare earths are usually found associated with thorium oxide. No price can be given for thorium oxide, as the single buyer declines to name any fixed quotation.

No use has been found yet for the oxides of tantalum and niobium. There is no demand for them, and consequently no price can be given.

GRAPHITE AS A LUBRICANT.

Lubricants are divided into three classes: Fluid, or oil lubricants; pasty, or grease lubricants; and solid, or dry lubricants. Of the substances used in the third class the most remarkable is graphite, the value of which as a lubricant is so generally conceded that it seems strange that its use is not more extensive. All users of machinery know its value and use it in an emergency as a "cooler" of hot journals. While this use is general, the amount used is not at all commensurate with its merits.

Graphite has a very low coefficient of friction. It is composed of but one element, carbon, hence is not affected by the action of acids, gases, alkalies, or by considerable changes of temperature. It oxidizes slowly at a temperature above a red heat. When subjected to the action of any of the conditions mentioned it retains constantly its peculiar property of low coefficient of friction. Graphite is soft, and adheres readily to metallic surfaces when subjected to light pressure. This property causes it to fill the pores and to even up the roughnesses of metallic surfaces in rubbing contact. The surfaces so coated are thus covered with a veneer of allotropic carbon or graphite, which reduces the coefficient of friction of the rubbing surfaces to practically that of graphite itself, and also protects those surfaces from the action of vapors. This applies particularly to cylinders; hence the special value of the use of graphite in cylinder lubrication, where high pressure steam, oil, or gas is used.

For many years the accepted type of a lubricant was an oil or fat, but these bodies, whether of vegetable or mineral origin, are liable to become rancid and break up into other compounds under the action of the heat and vapor to which they are exposed, and often exert a corrosive action on the metal surfaces.

Soon after the discovery of petroleum in 1859 mineral lubricating oil came into use. These hydrocarbon oils were free from the danger of corrosive action, but lacked body or viscosity under heat and severe service. This was followed by the compounding of the mineral oils by the addition of the body-giving animal oils. These compounded oils do not become rancid, as the animal oil is sealed from contact with the air. For many years these compound oils have met the requirements of cylinder lubrication.

The use of high pressure steam, oil and gas in specially constructed engines has necessitated a much higher temperature in the cylinders. All the oil lubricants lose much of their body or lubricating value, or else char or vaporize under this higher temperature; and the question of insufficient lubrication and consequent deterioration is a serious one.

While the fluid lubricants have been improved the pasty lubricants or greases have also received much attention. In general these greases are compounds of a fatty acid with a base. The result of this combination is a soap which may be soluble or insoluble. This soap is dissolved or blended with more or less quantity of lubricating fluid according to the stiffness desired. The primary object of these compounds is to produce a lubricant of greater body than any oil and which can be used in loose or open friction places.

Solid lubricants are often mixed with these, the grease serving as the vehicle or carrier whereby the dry lubricant is conveyed to the place of service. As a rule, these pasty lubricants are not adapted to cylinder lubrication. The action of the heat and vapor in the cylinder breaks up the compound, leaving a charred or solid residue which is liable to clog the cylinder ports.

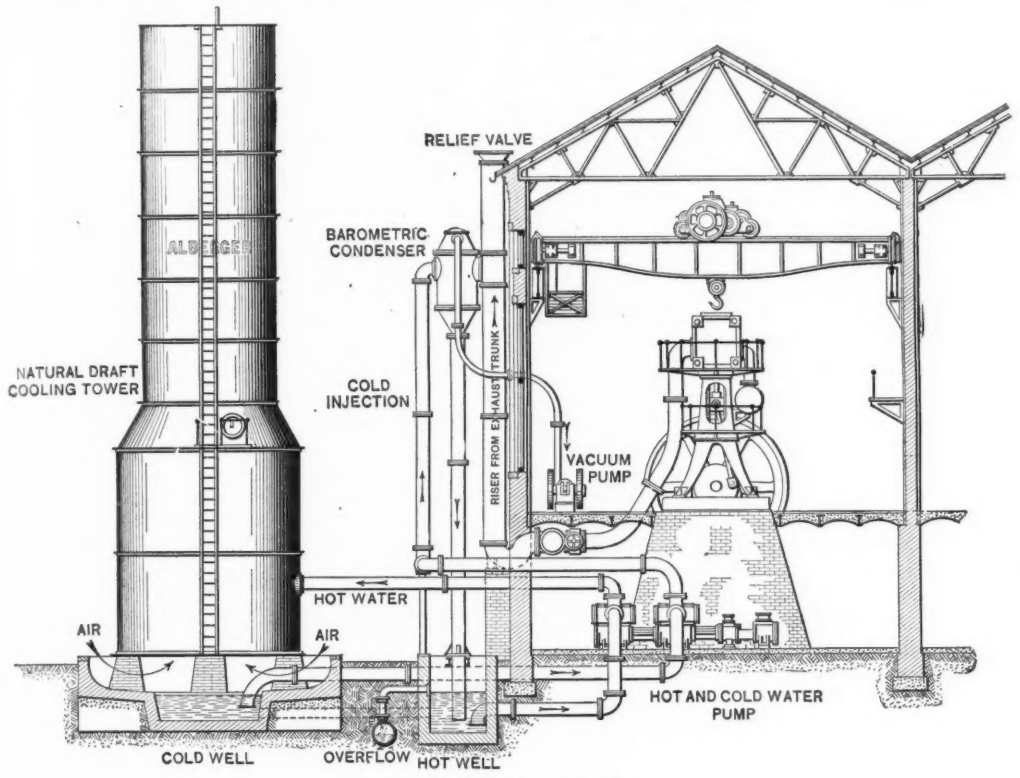
Of the solid or dry lubricants, graphite has already been mentioned as the most remarkable. The others worthy of mention are talc, lycopodium powder and mica. A solid or dry lubricant must be fed in the form of a powder. Having no means of feeding such a lubricant conveniently, yet appreciating the value of its low coefficient of friction, many inventors have attempted to use this mineral by mixing it with other substances to form part of the journal bearing itself. Over 125 patents for journal-bearing composition, etc., have been issued with graphite forming the principal anti-friction part of the composition. Lately many patents have been issued for various types of lubricators which were designed to feed graphite or some mixture of graphite into the cylinder or on the bearing. Some of these are good, but lubricators are mostly designed to feed oily lubricants, and this is the one reason why the use of graphite has not been much more extensive, and why it is used sparingly and in cases of trouble.

Some months ago, W. F. Downs, of Jersey City, N. J., conceived the idea of extending the use of graphite by making a graphite mixture that would feed through the ordinary type of lubricators. Recent tests of this mixture in some of our most important engine building shops have shown this attempt to be successful.

The idea of the suspension of graphite in oil is not at all new, but still seems paradoxical. If it can be accomplished, it certainly solves the question of feeding graphite as a lubricant into many places where its peculiar properties make it specially valuable. Graphite, by reason of its specific gravity, which is usually given at 2.3, tends to sink rapidly, even more rapidly than other substances of equal specific gravity on account of its smooth, crystalline surface and low coefficient of friction. Solid particles do not sink as fast in oil as in water, on account of the viscosity of the oil. If the particles of graphite be coated so as to have viscous faces, and the size of the particles be such that the ratio of extent of surface to weight be great, then the combined cling of the coated particles and of the

fluid oil offer a force resistant to motion, and if this be equal to or greater than the force of gravity of graphite will be distributed or suspended in the oil.

This, it is claimed, is done in the manufacture of the compound or mixture of graphite and oil mentioned, and the use of graphite, particularly as a cylinder lubricant, will be largely increased by its success.



ALBERGER CONDENSER.

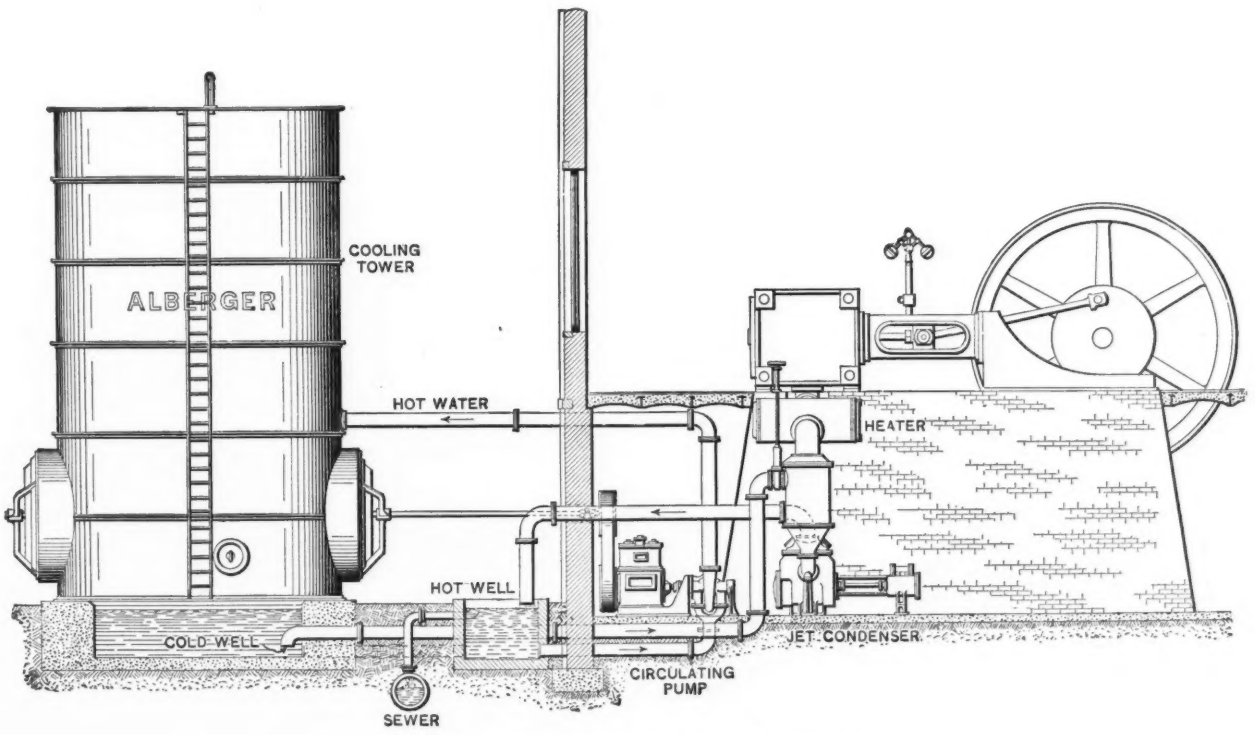
ply for condensing purposes and have been equipped with condensing engines and cooling towers. The selections of site has been influenced by various causes, such as better coaling facilities, more favorable distribution of the electric current, the lower cost of land away from the water fronts, and the knowledge that results practically equal to those obtainable with a natural water supply can be had at any place with properly applied cooling towers.

The Alberger cooling tower, manufacturing by the Alberger Condenser Company, New York, is cylindrical in form, and is constructed of sheet steel, carefully riveted and braced. It is a fitting adjunct to a mill or power station. There are two types, one in which the air is circulated by means of one or more fans, and the other by means of a stack placed above the cooling tower proper, which produces a draft when the air becomes heated by the hot water from the condenser. The former type is especially suited for ammonia condenser work and for steam condensers where the available space is limited, or where the tower can be placed to advantage on the roof of the engine or boiler house. While, of course, the power required to operate the fan is a constant charge, still by running the fan at a reduced speed, when the load is light or when the weather is cold and by returning the heat of the exhaust steam from the fan engine to the boiler by way of the feed-water, the actual charge is reduced to an inconsiderable amount.

Figure 1 shows the Alberger cooling tower, jet condenser and circulating pump, as applied in an ordinary situation where the cooling tower can be placed upon the ground adjoining the engine room. The condensing apparatus shown is of the jet type, taking its injection from the cold well and discharging into the hot well on the same level. Its functions are the same as if a natural water supply was used for condensing purposes, but its operation is more thoroughly assured on account of the invariable suction lift and constant supply of cold water.

The Alberger natural draft cooling tower represents the most advanced type, as no power is required to circulate the air. This tower is preferably about 80 feet high, and consequently should be placed on the ground level. It is a good device to use when it is desirable to convey the vapor from the tower above adjoining buildings, or where the tower must be at some distance from the engine room, and such a location renders inconvenient the transmission of power to the fan. Two or more of these towers can be operated in a battery with the same results as when a single tower is employed.

The condensing apparatus shown in Fig. 2, is the Alberger barometric condenser, and is especially suited to large engines or to stations containing a number of engines, which may be exhausted into one condenser.



ALBERGER CONDENSER AND COOLING TOWER.

THE ALBERGER COOLING TOWERS.

Cooling towers were commercially introduced into this country about 10 years ago. Since that time they have been installed in a great variety of situations and have become recognized as an important and valuable adjunct to power stations and refrigerating plants, where the water supply is limited.

That the experimental stage has been passed is shown by the fact that numerous steam plants have been located where there is no natural water sup-

FUSIBLE BOILER PLUGS.

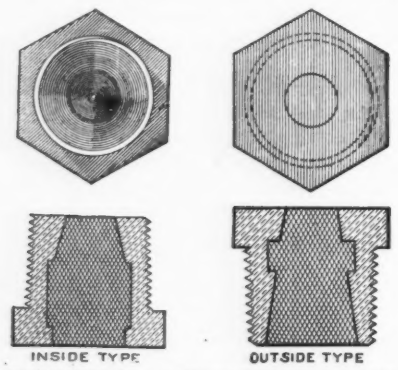
The recent action of the United States Treasury Department in enforcing the provisions of Section 4436 of the United States Revised Statutes, regarding the specifications as to the manufacture of fusible plugs, has attracted attention to this article.

Fusible plugs have been used in boilers for a great many years, and the Government, recognizing the important function of this boiler accessory, requires that all plugs used on boilers of steam ves-

sels should be made of bronze and have no other filling but pure Banca tin. Since the disaster at Philadelphia last fall, the United States Steamboat Inspection Service of the Treasury Department has taken cognizance of the fact that inferior plugs were offered upon the market and issued a circular requiring that all fusible plugs should be filled with pure Banca tin and stamped with the manufacturer's name, and that an affidavit setting forth this fact should be filed with the inspector having charge of the boiler inspection at whatever point the plugs were used.

The Lunkenheimer Company, of Cincinnati, O., has manufactured fusible plugs for a number of years, all of which comply with these specifications, and, having made affidavit before the United States Steamboat Inspection Service to the effect that its plugs comply with these requirements, the same are accepted by all inspectors throughout the United States.

Two forms of plugs herewith are illustrated, the outside and inside patterns, same to be screwed in

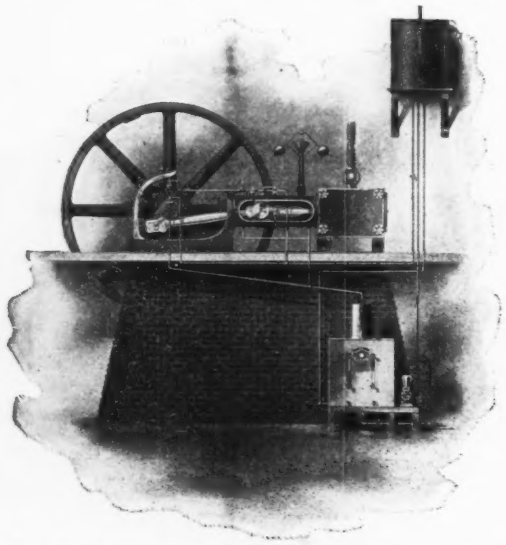


LUNKENHEIMER FUSIBLE BOILER PLUGS.

either from the inside of the boiler or from the outside through the fire box or shell. These plugs are manufactured by the Lunkenheimer Company, of Cincinnati, Ohio.

MODERN LUBRICATION OF ENGINE BEARINGS.

While the boiler room of to-day when compared with that of a decade ago shows great changes, a most important feature in the economical operation of the machinery, has until recently escaped attention,



DUPLEX TYPE WHITE STAR OIL FILTER APPLIED TO A CONTINUOUS OILING SYSTEM.

that of the automatic lubrication of main engine bearings, slides, eccentrics, crank-pins, etc.

This problem is claimed to have been successfully solved by the "White Star" gravity filtering system, employing the duplex and multiplex types White Star oil filter, as designed and installed by the Pittsburg Gage & Supply Company, Pittsburg, Pa., and illustrated herewith.

The manufacturer's claims are that a complete pipe system for oiling dispenses with 80 per cent of the labor by automatically handling all the oil applied to or released from the machinery, reducing to a minimum both the loss by friction and its attendant expense for repair. An abundance of oil is continually supplied to the bearings, while waste in handling the oil in cans by hand-oiling is entirely obviated.

In addition to this, a large saving in cost of lubrication is said to be effected by the White Star oil filter purifying all the oil discharged from the machines, and delivering it again to the system in good condition for us. In the entire process, the only loss of oil is from evaporation, as the pipe system prevents all waste.

The oil is fed to the several cups by gravity, from an elevated reservoir, and, after passing through the bearings is carried by pipes to the filter where it is purified and returned by the pump to the storage tank above. The third pipe carries any surplus back to the filter and prevents overflow.

The supply of oil is thus continuous and uniform, securing the most desirable results.

A large number of the White Star filtering systems are in successful operation, and among the prominent concerns whose plants are thus equipped, are the following: Armstrong Cork Company, Pittsburg; West End Traction Company, Pittsburg; Jones & Laughlins, Limited, Pittsburg; Allegheny County Light Company, Pittsburg; Union Steel Company, Pittsburg; United States Mint, Philadelphia; American Steel & Wire Company, Newburg, Ohio; Connecticut Railway & Lighting Company, Waterbury, Conn.; Citizens' Railway, Light & Power Company, Mansfield, Ohio. An illustrated booklet describing the White Star filtering system, together with the process of oil filtration will be sent by the Pittsburg Gage & Supply Company to those interested.

ENAMELLED IRON VESSELS FOR CHEMICAL WORKS.—Enamelled iron vessels are frequently required in chemical works for boiling down solutions which must not be contaminated with iron, and for which vessels of lead or other substances cannot be advantageously employed. It is possible to obtain enamelled cast iron pots, or other shapes, up to a diameter of 8 feet and a height of 5 feet from manufacturers who make a specialty of such work.

CONCENTRATING IRON ORE IN NORWAY.—The *London Engineer* says: "It is stated that the Edison Syndicate for treating iron ore has now under consideration the erection of large works in Norway, having obtained from the Government large concessions of ore, which are being examined by Mr. Adams and Mr. Roberts, of Albany, while Prof. Turrettini, of Geneva, is getting out an electrical and hydraulic installation for generating 10,000 to 15,000 horse-power from waterfalls of which the syndicate also holds the concession."

PATENTS RELATING TO MINING AND METALLURGY

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon receipt of 25 cents.

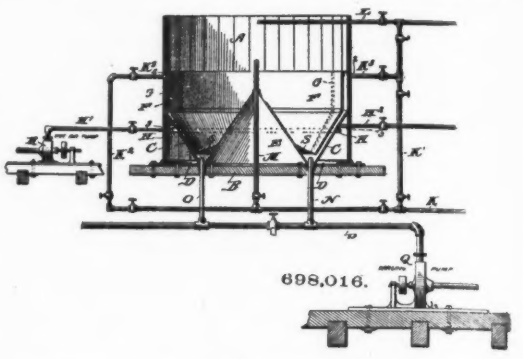
Week ending April 22, 1902.

697,964. MILL FOR ROLLING TAPERING BODIES.—Michael Baackes, Cleveland, Ohio. The combination with a stationary roll, a movable roll, feed-screws to the roll-driving mechanism and constructed to actuate said screws to feed the movable roll toward and from the stationary roll in unison with the rotation of the rolls.

697,988. PIERCING AND SHAPING METALLIC INGOTS.—Leonard D. Davis, Erie, Pa. A rolling mechanism comprising two opposed disks of rolls having their axes arranged in different planes and also in intersecting planes.

697,996. LUBRICANT AND PROCESS OF MAKING SAME.—William F. Downs, Jersey City, N. J. A lubricant consisting of particles of a solid lubricant coated with an oil in which it is insoluble and suspended in an enveloping oil with which the coating-oil is not miscible.

698,016. CYANIDE-TANK.—James J. Hervey, Randsburg, Cal. A cyanide-tank having a tapering bottom and a central cone arranged in connection with the bottom, an annular lining arranged in the tank and open at its lower end, a filtering-screen connecting the lower end of the lining and



698,016.

the central cone, the air and water pipes, the charging and discharging pipes, and the forcing means connected with said pipes.

698,032. HOISTING AND CONVEYING MACHINE.—Timothy Long, Cleveland, Ohio. A revoluble derrick, a traveling adjustable conveyer supported and carried by the derrick, a receiving-hopper mounted on the frame of the derrick, and an adjustable telescopic spout attached to the ends of the conveyor beams, and means for operating the same, in combination.

698,062. METHOD OF MANUFACTURING GAS.—Frederic W. C. Schniewind, New York, N. Y., assignor to the United Coke & Gas Company, Charleston, W. Va., and Philadelphia, Pa., a corporation of West Virginia. A method of manufacturing gas which consists in subjecting carbonaceous material to dry distillation, separating the gases thus produced into two portions, extracting the illuminants from one divided portion and mixing said illuminants with the other portion in order to enrich it, treating another body of carbonaceous material to produce water-gas and mixing said water-gas with the enriched portion of the gas produced by distillation in order to increase its volume and diminish its percentage of sulphurous impurities.

698,072. PAVING-FLAG.—Josef Steinbach, Vienna, Austria-Hungary. Paving-flags, composed of a layer of concrete firmly connected by means of a strong pressure with an upper layer formed of a mixture of natural asphalt-meal, sulphur, cork-meal, iron oxide and granulated porphyry or any other kind of hard homeogeneous stone.

698,105. SUBMARINE GOLD-SAVING DEVICE.—Lee D. Craig, San Francisco, Cal., assignor, by mesne assignments, to Sub Marine Mining Company, San Francisco, Cal., a corporation of California. A submarine mining-machine, comprising an elongated open-ended sluice-box adapted to be dragged along a subaqueous bottom, means for operating the box, separating means within the box, and wheels at the respective ends of the box, the forward wheels occupying somewhat higher plane than the rear wheels.

698,113. COUPLING-WELDING ROLLS.—David Heggie, McKeesport, Pa., assignor to National Tube Company, Pittsburg, Pa., a corporation of New Jersey. A roll for forming pipe-couplings and similar articles, provided with a plurality of working faces each corresponding to a finished coupling and an annular projection or projections or ribs intermediate the working faces for dividing the blank and finishing the end faces of the couplings.

698,147. PICK.—Edward A. Smith, Fowler, Colo., assignor to F. W. Nash and E. M. Sprague, Denver, Colo. The combination with a pick-eye having a polygonal opening and traverse ribs on the interior end walls of said opening, of pick-points having shanks polygonal in cross-section adapted to said opening and formed with grooves to engage said ribs, and a wedge driven into said opening between said shanks and spreading them apart and holding the grooves of the shanks locked to the ribs of the opening.

698,148. BOTTOM FOR SHEET-HEATING FURNACES.—President F. Smith, Pittsburg, Pa. A bottom for sheet-heating furnaces formed of a loose mass of hard-burned non-combustible balls or approximately globular bodies, providing interstitial passages and a support for the packs upon the higher portions of the balls.

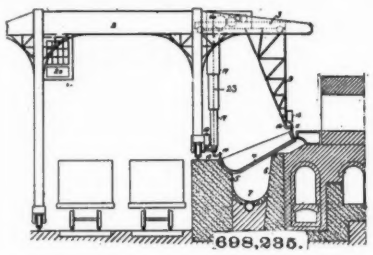
698,163. PROCESS OF REFINING SPELTER.—Charles Wessell, New York, N. Y. A process of refining spelter which consists in treating the melted spelter with horn, phosphorus and magnesium.

698,171. APPARATUS FOR MANUFACTURING CONICAL TUBES.—Emil Bock, Dusseldorf, Germany. In a machine for manufacturing conical tubes form tapering strips the combination with mandrels of different diameters, of a slide carrying said mandrels, means for axially moving said mandrels, means for moving said slide at right angles to the movement of the mandrels, and means for holding said strips.

698,214. PROCESS OF FLANGING METALLIC-TUBES.—Norman McKechnie, Cleveland, Ohio. A process of flanging

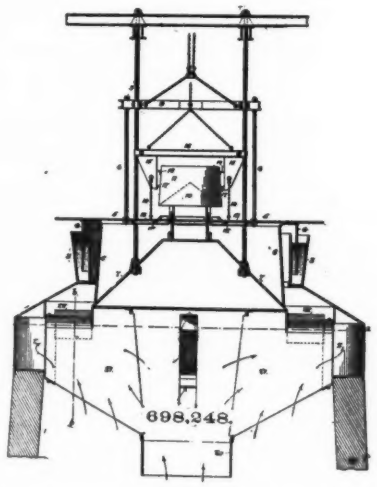
metallic tubes, which consists in fitting upon the tube two or more collars, leaving uncovered between them enough of the tube to form the flange or flanges; in passing an electric current through said tubes endwise whereby the uncovered parts of said tube are heated to a welding heat, and in applying endwise pressure upon said tube and end collars whereby the uncovered parts of the tube are thrown outward and the flange is pressed into shape and the meeting faces of the metal welded together between said collars.

698,235. COKE-LOADING APPARATUS.—Samuel T. Wellman, Charles H. Wellman, John W. Seaver and Thomas R. Morgan, Cleveland, Ohio, assignors to the Wellman-Seaver Engineering Company, Cleveland, Ohio, a corporation of Ohio. The combination with a crane structure, of a trolley adapted to run thereon, depending


698,235.

and traversely-rigid lifting and supporting devices carried by said trolley, a loading-pan, and supports to hold the pan in position under the crane structure, so that it can be engaged and lifted by the supporting and lifting devices.

698,236. HYDRAULIC AIR COMPRESSOR.—Joseph Weyand, Guttenberg, N. J. The combination with a shell having water inlet and outlet openings a lever pivoted within the shell, two valves controlling the said openings and connected with said lever and a vertical rod connected at its lower end with the said lever and provided with vertically-sliding floats, the lower float having a limited upward movement on the rod to raise it, of air delivery and air vent on the upper end of the shell and a valve conveying the air vent operated by the direct action of the upper float.


698,248.

698,248. BLAST-FURNACE.—Ernst Bertrand, Kladno, Austria, Hungary, assignor to the Wellman-Seaver Engineering Company, Cleveland, Ohio, a corporation of Ohio. A blast-furnace having a feed bell or cone and a vertically-movable hopper above the same, said hopper having a normally closed top and being provided with an external seal whereby its vertical movement is permitted without causing escape of gas.

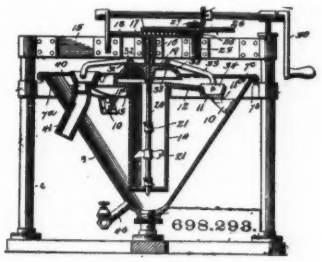
698,268. PROCESS OF MAKING CEMENT.—Otto Friz, Nuremberg, Germany, assignor to C. A. Kapferer and Wilhelm Schleuning, Munich, Germany. A process of manufacturing white cement, consisting in the admixture of lime and clay as free as possible from iron, together with feldspar, in about the proportions stated, and burning the resultant mass to the verge of fusing, that is to say, beyond the sintering limit.

698,273. WIRE-DRAWING.—William J. Glover, St. Helens, England. In a wire-drawing machine, a drawing-roll constructed in the form of a hollow drum having a closed periphery and means for introducing cooling fluid to the hollow of said drum and discharging it therefrom without its coming in contact with the wire to be drawn.

698,283. REVERSING VALVE FOR REGENERATIVE GAS-FURNACES.—Harry Hyatt and John McGeorge, Cleveland, Ohio, assignors to the Wellman-Seaver Engineering Company, Cleveland, Ohio, a corporation of Ohio. A reversing-valve for regenerative gas-furnaces consisting of a box-like casing, a lining of refractory material for said casing, a transverse partition dividing the casing into two chambers, and blocks extending from one side of the casing to the partition, said partition together with the blocks and refractory lining being supported on plates extending along the edges and across the bottom of the casing.

698,292. PROCESS OF RECOVERING METALS.—Edward D. Kendall, New York, N. Y. A process of separating and recovering metals from solutions containing them, which consists in flowing over a mass of fragmental carbon which serves as a cathode, a dilute solution of potassium cyanide containing metals in solution, and at the same time subjecting the dilute solution to the action of an electric current having sufficient amperage and electromotive force of at least 5 volts, the anode being carbon immersed in a solution of caustic alkali which is separated from the cathode solution by a porous diaphragm.

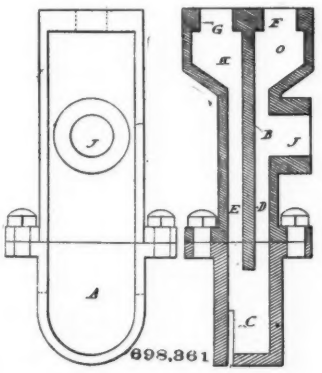
698,293. ORE CONCENTRATOR.—Charles M. Kimball, Port Huron, Mich. An ore-separator comprising in its construction an open tank having a settling-trough with a generally imperforate bottom located within its upper portions, means also within the tank for circulating water and tailings from the lower part of the tank to said trough, and means for moving the tailings which lodge in said trough along the bottom thereof, a tailings-outlet from the trough extending through the outer side of the tank, whereby gold or other heavy material will remain at the bottom of the tank while the tailings will be elevated into the trough, and automatically and continuously removed therefrom while the water overflows from the trough into the tank.


698,293.

698,311. MAGNETIC SEPARATOR.—John H. A. McPhee, Dunedin, New Zealand. A pulley consisting of a core and a shell surrounding the same and integral therewith, a magnetic coil wound upon said core and extending substantially to the inner face of said shell, a shaft extending through said core for supporting and rotating the pulley, suitable electrical connections for said coil, insulated means for dividing the pulley in sections, a belt operated by said pulley and adapted to receive and separate the material, means for supplying the material to the belt, and means for operating said pulley in a rotary direction and to impart a transverse movement to the pulley while it is rotating.

698,341. PROCESS OF TREATING BRINE.—Gerhard N. Vis, Schweizerhalle, Switzerland. A process of treating brine to obtain crystallized sodium chloride free from gypsum which consists in mixing the brine with slaked lime and ammonium sulphate, passing carbonic acid in the mixture, separating the liquor from the precipitate, evaporating the liquor, separating the crystallized sodium chloride from the mother-lye containing ammonium sulphate and reusing this mother-lye in a subsequent purification to provide the brine with ammonium sulphate.

698,354. METHOD OF BURNING OIL.—George L. Badger, Quincy, Mass., assignor to Equitable Auto-Truck, Power and Burner Company, Portland, Me., and Lynn, Mass., a corporation of Maine. Filed August 2, 1900. The method consists of vaporizing the hydrocarbon or oil under pressure by heat, dividing the supply of vapor into fine jets, mixing each jet of vapor with air, additionally mixing, by the expansive force of the oil-vapor, with each jet of mixed vapor and air, a further supply of air proportional to the amount of vapor supplied by each jet, commingling the several jets of mixed vapor and air, and igniting the mixture.


698,361.

698,361. OIL BURNER FOR FURNACES.—William Booth, San Francisco, Cal. An oil-burner consisting of a flat rectangular casting provided with an oil-passage and adjacent steam-passage, separated by a partition, a nose-piece bolted onto the casting in front of the partition, the interior of said nosepiece forming a chamber, a horizontal floor in said chamber and a slit in the forward end of the nosepiece in line with the floor of the chamber.

698,362. MEANS FOR COMPRESSING OR LIQUEFYING GASES.—Bruce Borland, Cambridge, Mass. A compressing-cylinder open at its bottom, a gas-receiver carried by the upper portion of the cylinder, a communication between the gas-receiver and cylinder, which communication is normally closed by a valve opening inwardly in the receiver, said receiver being provided with a circumferential chamber between its inner and outer walls in communication with the main chamber, and means for drawing off the compressed gas from the receiver.

698,374. TOOTH AND BASE FOR PHOSPHATE-LOGS.—Elmer E. Cline, Ocala, Fla., assignor to the Ocala Foundry and Machine Works, Ocala, Fla. A device comprising a base-plate provided with a recess having substantially the shape of a double wedge and also provided with semi-cylindrical apertures merging into said process, a tooth provided with an enlarged portion having substantially the shape of a double wedge and also provided with semi-cylindrical apertures mating said apertures of said base-plate, and cylindrical pegs of resilient material, for detachably engaging all of said apertures.

698,378.

698,378. GUIDE FOR STAMP-STEMS.—David C. Demarest, Angels Camp, Cal. A guide consisting of a casting secured to the battery-frame above the stamp or line of stamps, and formed with a tapering socket or opening through the casting above each stamp, and with a passage through the front wall of each socket for the lateral admission or removal of the stamp-stem, a sectional tapering sleeve or shell fitted around each stem and adapted to fit and seat itself in the socket in the casting, and a lug on the sleeve or shell adapted to project through the opening in front of the socket.

698,399. METHOD OF MAKING MAGNESIUM-PEROXIDE COMPOUND.—Franz Fuhrmann, Berlin, Germany. The process consists in forming an aqueous mixture of a soluble salt, a corresponding ammonium salt and sodium peroxide adding to the mass, after the resulting reaction, a quantity of alcohol, and separating the precipitate from the liquid.

698,408. LIQUID-FUEL BURNER.—John W. Neumann, Louisville, Ky., assignor of one-half to John E. Norris, Louisville, Ky. The combination with a substantially trough-shaped fuel-tray having an arched and symmetrically-curved overhanging hood, of a shield arranged underneath and in front and rear of said tray, and a damper comprising a flat plate having an inner flange adapted to rest on the front edge of said shield and support the damper, said damper being arranged to partially close the aperture between the shield and hood.

698,415. BIT FOR WELL-DRILLING APPARATUS.—James W. Sloan, Corsicana, Tex., assignor of two-thirds to J. S. Cullinan and H. G. Johnston, Corsicana, Tex. In combination a pipe-section, a shoe carried in the lower end thereof and having a portion of its inner face of the same internal diameter as the pipe-section, removable bits arranged in and provided with integral means engaging with the shoe to prevent the dropping down thereof, means pivotally connected to the top of the bits and arranged within and engaging in the wall of the pipe-section for locking the bits in operative position, and a hinge connected to the upper end of said means and adapted when extended to cause said locking means to engage in the pipe-section and when contracted to release the said locking means so the bits can be removed.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy.

Week Ending April 3, 1902.

5,483 and 5,484 of 1901. HAND ROCK DRILL. L. T. Sicka, Denver, U. S. A. In power operated hand work drills, operated by a crank, methods of releasing the drill when jammed.

6,090 of 1901. STEEL ALLOYS. R. A. Hadfield, Sheffield. Special steels for armor piercing porjectiles, consisting of alloys of chromium, tungsten, nickel, etc.

7,932 of 1901. IRON OXIDE MAKING.—J. Hargreaves, Farnworth in Widnes. Process for producing oxide of iron from chloride, by adding just enough lime to reduce the iron, but not to reduce the manganese that is usually present, thus producing a better quality of oxide of iron.

18,637 of 1901. GRINDING MILL.—T. Breakell, Derby. An improved grinding mill with adjustable dies on the rotating part.

1,003 of 1902. BLAST FURNACE DISCHARGE. L. Lincoln and C. S. Gooding, Boston, U. S. A. Method of regulating the pressure on molten iron discharging from blast furnaces.

2,115 of 1902. HARDENING STEEL.—G. Kolb, Mannheim, Germany. A composition for hardening steel, consisting of a mixture of colophony, copper vitriol, prussiate of potash and linseed oil.

2,260 of 1902. PURIFYING BAUXITE.—C. M. Hall, Niagara. U. S. A. Improvements on the inventor's process for purifying bauxite.

PERSONALS.

Mr. Victor Clement, of Salt Lake, Utah, is now in New York City.

Mr. L. V. Swiggert, of Sumpter, Ore., is a visitor in New York City.

Mr. H. G. Gilkerson has been appointed city engineer of Telluride, Colo.

Mr. John A. Church, of New York City, is now at the Congress Mine in Arizona.

Mr. S. J. Sullivan, of Leadville, Colo., is in Mexico looking after mining interests there.

Mr. W. H. W. Hamilton, mining and consulting engineer of Sumpter, Ore., is visiting New York City.

Mr. J. H. Weddle, manager of the Homestake Company at Leadville, Colo., is spending a few weeks in California.

Mr. William Bailey, mining engineer, of Jacksonville, Ore., has been stopping at the Gilsey House, New York City, this week.

Mr. Stanley A. Easton has become associated with the distinguished mining engineer, Mr. F. W. Bradley, of San Francisco, Cal.

Prof. B. Sadtler, inventor of an improved zinc retort, who has located a plant at Gas City, Kan., has been looking over the mining field at Leadville, Colo.

Mr. R. A. F. Penrose has just returned from a trip around the globe, and has gone to Pierce, Ariz., to visit the Common Wealth Mine, of which he is president.

Mr. G. S. Minckley, of Los Angeles, Cal., has been appointed manager of the Esperanza Mining Company, operating on Cedros Island, Lower California, Mex.

Mr. Edgar Rickard, who has been acting as consulting engineer to El Progresso mines in Lower California, is now in Denver, Colo., on professional business.

Mr. Charles M. Schwab, president of the United States Steel Corporation and a party of officials are visiting the plants of the corporation in the Pittsburg District.

Mr. George W. Small, mining engineer, formerly in the employ of Capt. J. R. De La Mar, has returned to Salt Lake, Utah, recently, after a 5-months' trip in Mexico.

Mr. P. L. Kimberly, of Sharon, Pa., one of the heaviest mine operators of Utah, is in Leadville, Colo., looking over his property there with a view of starting important work.

Mr. James Cusick, formerly State Mine Inspector for South Dakota, has gone to Cape Nome, Alaska, to act as superintendent of the Cape Nome Hydraulic Mining Company.

Mr. C. W. Jordan, manager of the Haggarty-Jordan Copper Mining Company, of Battle, Wyo., recently spent several weeks in Humboldt County, Nev., inspecting a mining property.

Mr. E. E. Loomis has been made vice-president of the Delaware, Lackawanna & Western Railroad. He will have charge of the coal department of the company with offices in New York City.

Mr. Benjamin B. Lawrence is now at Telluride, Colo., in connection with the Smuggler Union Mining Company, of which he is president. Mr. Lawrence is expected in New York City about May 15.

Mr. C. C. Harris, of Chihuahua, Mex., who is interested in gold and silver mining properties at Santa Barbara, has been spending the past week in New York City, stopping at the Grand Union Hotel.

Mr. William H. Davies, of Hazleton, Pa., mine inspector of the Fifth Anthracite District, has resigned to accept the superintendency of the Lehigh Valley Coal Company's collieries in the Hazleton region.

Dr. A. P. Coleman, of Toronto, Ont., has left for Sudbury, Ont., where he will spend several months in making for the Government an exhaustive investigation of the mineral resources of the nickel and copper region.

Mr. Gentry Hillman, for some time furnace manager for the Sloss-Sheffield Steel and Iron Company, in the Birmingham, Ala., District, city furnaces, has accepted a similar position with the Tutweiler Coal and Iron Company, in charge of the Vanderbilt furnace.

Mr. Robert M. Raymond, who recently returned from China, is now in New York City. We understand that Mr. Raymond is to succeed Mr. Philip Foster as general manager of El Oro Mine, in Mexico. Mr. Foster is to occupy an important position in London.

Mr. Temple Tutweiler, formerly with the Tutweiler Coal and Iron Company, has accepted a position under Superintendent Warner Shook, who is in charge of the Ensley, Ala., furnaces of the Tennessee Coal, Iron and Railroad Company. Mr. Tutweiler is the youngest furnace manager in the South.

Mr. G. L. Holmes, of the Link-Belt Machinery Company, Chicago, Ill., has gone to the Pacific Coast in the interests of the dredge department of the company. He will spend from 4 to 6 weeks in the placer regions of California and Oregon, with headquarters at the office of Meese & Gottfried Company, San Francisco, Cal.

Mr. W. M. McFarland, acting vice president of the Westinghouse Electric and Manufacturing Company, delivered a lecture on "Electric Power Distribution in Manufacturing" at Cornell University on Friday, May 9. The several different systems of distribution and their relative advantages were discussed and the manner of applying electric motors to machinery illustrated.

Mr. H. Tromp, the Dutch mining engineer, who has been visiting a large number of mining districts of Western North America during the past 5 months, reached Denver a few days ago and sails for Holland again on May 10. After spending a few days at his home in the Hague, he expects to leave for the Dutch East Indies, to take charge of mines in which the Dutch government is interested.

President J. C. Maben, who succeeded Mr. E. O. Hopkins at the head of the Sloss-Sheffield Steel and Iron Company, is in full charge now. The appointment of a furnace manager for the company is now under consideration. Mr. John Dowling, connected with the Trussville, Ala., Furnace Company, has been offered the management of the furnaces for the Sloss-Sheffield Steel and Iron Company.

Mr. R. D. Hassan, who has had charge of cement works in Ohio and Michigan, was chief mechanical engineer of the Peninsular Portland Cement Company at Cement City, Mich.; Mr. A. C. Tagge, formerly with the Link Belt Machinery Company, of Chicago, Ill., and mill superintendent for the Peninsular Company, and Mr. J. G. Dean, formerly head chemist for the Peninsular Company, have organized the firm of Hassan, Tagge & Dean, with offices in the Union Trust Building, Detroit, Mich. They will act as consulting engineers and chemists, and make a specialty of designing and constructing cement plants and investigating cement properties.

Prof. W. G. Miller has been appointed Provincial Geologist and Inspector of Mines of Ontario. This is a new office, recently provided for, and the appointment took effect May 1. Prof. Miller has occupied the chair of geology and petrography at Queen's University, and has for some time past been connected with the Ontario School of Mines at Kingston. He has also been associated with the Bureau of Mines in the economic exploration of northern and eastern Ontario, more particularly in connection with the iron, gold and corundum resources of those districts. The appointment is an excellent one. Prof. Miller has done good work, and much may be expected from him in the larger field opened to him by his new position.

OBITUARY.

Francis F. Orbiston, a prominent mining engineer, died at Coolgardie, Australia, on April 20.

James H. Morgan, for many years a mine superintendent of the Philadelphia & Reading Coal and Iron Company, died at Shenandoah, Pa., on May 4 after a short illness of pneumonia. He was 49 years old.

Howard van Fleet Furman, one of the best-known metallurgists and mining engineers in this country, died April 28 of pneumonia in Mapimi, State of Durango, Mex. Mr. Furman was about 45 years of age and was born in New York City. He graduated from the School of Mines of Columbia University in 1881 with honors, and went to Colorado in 1882. As a metallurgist he made a reputation while employed by the Globe Smelting and Refining Company, in Denver. Mr. Furman started as assayer at the smelter, and between 1882 and 1888 was successively assayer, chemist and foreman of the Germania Lead Works in Utah, assistant superintendent of the Billings Smelter, Socorro, N. Mex., and superintendent of the Bailey Smelter, in Denver. He was consulting engineer and metallurgist from 1888 to 1894 of several large companies in Arizona and the Southwest. From 1894 to 1895 he was chief assayer of the United States Mint at Denver, being in charge of the practical work. In the fall of 1895 and until the spring of 1897 he was professor of metallurgy at the Colorado School of Mines, at Golden.

He was sent to Abyssinia by the Pentagon Company of London, Eng., to obtain, if possible, concessions for mining from King Menelik, but the conditions required of the London Company rendered its plans impracticable. Mr. Furman was then sent to Alaska. He went to Mapimi 3 months ago to assume charge of the smelting plant of the Compania Minera de Penoles. The superintendency was given him after he had made a success of treating a complex gold and copper ore that was considered very difficult to handle.

Prof. Furman found time to read a number of papers before societies. These were collected and published in book form. He was a fluent writer, and his "Manual of Practical Assaying" is a recognized standard work. It has passed through several editions.

One of his associates at the School of Mines says of him: "He was a man whose chief characteristic was his constant studiousness and the thorough way in which he always kept up in his profession. As a teacher he was very popular. He constituted an unfailing source of information to students, whether in drafting their studies or the elaboration of their graduation theses. His physique was not robust and his health was always somewhat delicate." He left a widow and a son.

SOCIETIES AND TECHNICAL SCHOOLS.

LEHIGH UNIVERSITY.—The Register of this university, at South Bethlehem, Pa., just issued, shows attendance of 554 students, from 26 States and 9 foreign countries. There are 49 in the teaching staff.

Eleven courses of instruction are offered: Classical, Latin-Scientific and also Civil Engineering, Mechanical Engineering, Metallurgical Engineering, Mining Engineering, Electrical Engineering, Analytical Chemistry, Geology, Physics and Electrometallurgy. The graduates of the university for the 36 years of its existence number 1203.

The following scholarships will be open to competition at the annual examinations in June: Two in the Classical course of $150 and $100 each. One in the Latin-Scientific course of $125. Five in the following courses: Civil Engineering, Mechanical Engineering, Electrical Engineering, Mining and Metallurgical Engineering, and Chemistry of $150 each.

It is stated that provision is made for worthy and needy students whereby they may postpone payment of tuition until after graduation.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—The society will hold its annual convention in Boston, May 27 to 30, inclusive. The regular sessions will be in the Henry L. Pierce Building of the Massachusetts Institute of Technology. Among the papers to be read are the following:

"Proposed Standard for Machine Screw Thread Sizes," by Chas. C. Tyler, Pittsburg.

"A Method of Determining Temperature of Exhaust Gases in Combustion Engines," by R. H. Fernald, New York.

"Working Details of a Gas Engine Test," by R. H. Fernald, New York.

"Liquid Fuel Combustion," by Chas. E. Lucke, New York.

"Mechanical Stokers for Locomotives," by Fred H. Colvin, New York.

"The Flying Shear," by V. E. Edwards, Worcester, Mass.

"A Swiveling Joint for a 16-in. High Pressure Steam Main," by R. E. Curtis, Boston.

"Improved Indicator Cock for Engines," by Albert K. Mansfield, Salem, O.

"A Die for the Cold Working of Sheet Metals," by John D. Riggs, Pittsburg.

"Repairing a Broken Cylinder," by H. M. Lane, Scranton, Pa.

"Final Report of the Committee Appointed to Codify and Standardize the Methods of Making Engine Tests."

"Specifications for Steel Forgings, Steel Castings and Steel Boiler Plates," by W. R. Webster, Philadelphia.

"Tests on Steam Pipe Coverings," by Geo. H. Barrus, Boston, Mass.

INDUSTRIAL NOTES.

The Mine and Smelter Supply Company, of Salt Lake, Utah, has furnished the Carisa Mine at Tintic with 2 Durkee electric drills.

The Empire Steel and Iron Company, of New York City, has placed an order with the Ingersoll-Sergeant Drill Company for a $30,000 air compressor plant, to be erected at Oxford, N. J.

The Robins Conveying Belt Company, of New York City, has finished the plans for its new plant at Paterson, N. J., and is purchasing the equipment. Part of the machinery has been secured.

The Oil Well Supply Company, through its New York City office, is reported to have recently received some fair-sized orders for oil-drilling outfits to be shipped to Tampico, Mex., and the Dutch East Indies.

The Fred M. Prescott Steam Pump Company, of Milwaukee, Wis., will shortly remove its manufacturing department from Milwaukee to West Allis, a suburb of Milwaukee, where a new plant has been erected.

The offices of the International Steam Pump Company, heretofore located at Van Brunt and Rapelyea streets, Brooklyn, N. Y., are now located on the first and second floors of Nos. 114-18 Liberty street, New York City.

The Copake Iron Company has been incorporated to operate the Copake Iron Works, at Copake, N. Y., and will succeed the late Frederick Miles in the man-

ufacture of charcoal pig iron. The one stack will blow in about May 15.

The United Engineering and Foundry Company, with headquarters in Pittsburg, Pa., recently shipped a lot of rolling mill machinery to the Colorado Fuel and Iron Company, consisting of 3 10-in. rod mills and one 14-in. rod mill from the Lloyd-Booth plant, at Youngstown, O.

The Keystone Driller Company, of Beaver Falls, Pa., which lately secured a contract for 3 drilling equipments, which are to be utilized for testing placer ground in the Ivory Coast gold fields, West Africa, has received an order for a large driller for shipment to Johannesburg, South Africa.

The Pittsburg office of the Chicago Pneumatic Tool Company reports a large business with foundries and iron and steel plants. The entire business of the Chicago Pneumatic Tool Company, of Chicago, is reported to have been 100 per cent greater during the month of April than during the same month last year.

Abner Doble Company, of San Francisco, Cal., is preparing plans for extensions to its works, and hence will be in the market for some heavy machine tools, all of which must be equipped with electric drive. Among these will be a 72-in. planer of heavy pattern, with 16-ft. table. T. S. Waters is in charge of the equipment.

Mr. George Whiting, who has been associated with the Scully Steel and Iron Company, of Chicago, Ill., has resigned to engage in business for himself under the firm name of Geo. Whiting Company, 428 to 448 North Halstead street, Chicago, for the manufacture of all kinds of punching and shearing machines and bending rolls.

The Holthoff Machinery Company is getting its new plant at Cudahy, Wis., in order. The works are equipped in the latest manner, a railroad track running into each building. Two 20-ton Pawling & Harnischfeger electric traveling cranes and a Nordberg engine are being installed. The company has moved its offices to Cudahy.

The Badische Anilin and Soda Fabrik of Ludwigshafen-on-the-Rhine, Germany, shows a profit for the year 1901 of £505,986 ($2,529,930). This is an increase of £24,550 ($122,750), as compared with 1900. A sum of £200,000 ($1,000,000) has been appropriated for amortisation, and a dividend at the rate of 24 per cent (the same as 1900) has been declared.

Over 3,000 tons of iron pipe were exported last month via Eastern ports by the National Tube Company and R. D. Wood & Co., of Philadelphia. This is an increase of some 75 per cent over the consignments made abroad during March. The National Tube Company's exports represented a total of 2,141 tons. R. D. Wood & Co. made a shipment of 836 tons to Cuba.

The Wagner-Bullock Electric Manufacturing Company, through its New York city offices, has secured a contract for an electric power plant, to be installed in an office building in Honolulu, H. I. The order calls for 2 100-kw. generators and one 40-kw. machine. Each of these generators will be direct-connected to engines built at the Union Iron Works, San Francisco, Cal.

The Salt Lake, Utah, branch of Fairbanks, Morse & Company, C. P. Mason, manager, has moved to new quarters at 218-20 South West Temple street, giving it one of the finest warerooms in the west, with 4,500 sq. ft. of floor space. A recent order is from O'Meara & Lynch, of Tonopah, Nev., for a 40-h. p. Fairbanks-Morse standard gasoline geared hoisting engine, complete.

The H. W. Caldwell & Son Company, of Chicago, recently purchased the entire equipment of gear patterns, molding machinery, gear cutters and all other appliances pertaining to the power transmission business of the Walker Manufacturing Company, of Cleveland. The Caldwell Company states that it is prepared to furnish gears from the Walker patterns promptly, and that it will maintain the standard established for these gears by the Walker Company.

The Pittsburg (Pa.) Gage and Supply Company states that the unusual demand for the "White Star" oil filter has forced the company to enlarge again this department of its business by the taking of the entire third floor of their new works, 3101-3111 Liberty street, exclusively for the manufacture of the filters. The greater part of the second floor will be devoted to holding a large stock of all sizes of the "White Star" oil filters, enabling prompt shipments to be made.

The El Paso branch office of the Sullivan Machinery Company, of Chicago, Ill., has recently sold the Prieta Gold and Silver Mining Company, of Parral, State of Chihuahua, Mex., a complete air compressor and drill plant, consisting of compressor, receiver, drills and drill mountings, to be used in mines near Parral. It has also sold the Santa Eulalia Mining Company, John M. Wilson, manager, of Chihuahua, Mex., a complete plant, consisting of air compressor, receiver, drills and drill mountings and connections. These will be used in the noted Santa Eulalia mines, 12 miles southwest of Chihuahua.

The Westinghouse Electric and Manufacturing Company, of Pittsburg, Pa., has made an agreement with the Lorain Steel Company whereby the Westinghouse Company acquires the electric railway equipment business of the Lorain Company, formerly carried on under the name of the Steel Motor Company, at Johnstown, Pa. The Westinghouse Company will continue to maintain the works at Johnstown, Pa., and sell the steel motor as an adjunct to its own electric railway business. In view of the fact that the Westinghouse Company now controls the manufacture of the Lorain motors, these equipments hereafter shipped may be supplied with the nose spring suspension covered by the patents controlled by the Westinghouse and General Electric companies.

The Utah Mining Machinery and Supply House, of Salt Lake, Utah, has been incorporated. The company is capitalized at $100,000, divided into shares of $100 each. The incorporators and officers are: T. R. Jones, president; J. E. Galigher, vice-president and manager; W. W. Armstrong, treasurer; Walter Scott, secretary; W. H. Dickson, Col. E. F. Holmes, Joseph Farren, C. L. Rood, Henry Newell, Dr. S. H. Pinkerton, James T. Clasby, J. H. Tucker, Mrs. Susan B. Emery-Holmes and D. McPherson Boyd. Mr. Galigher, who has been with the Geo. M. Scott and the Scott-Strevell Hardware companies, will be manager. The company will be ready for business by the latter part of May at quarters in the old Oregon Short Line Building on West Temple street.

The Pneumatic Cyanide Process Company has incorporated at Denver, Colo., with a capital stock of $500,000. The incorporators and first board of directors are John W. Nesmith, president of the Colorado Iron Works Company; John H. Morcom, superintendent of the same company, and Jean F. Webb, the inventor and owner of the pneumatic cyanide process patents. The new concern will be prepared to build complete cyanide mills, equipped with the pneumatic features, and run them for 30 days before turning them over to the purchasers, a new departure in building of such plants. The officers of the new company will be John W. Nesmith, president; John H. Morcom, vice-president and treasurer, and Jean F. Webb, Jr., secretary. The price paid Mr. Webb for his patents is not given out, but is said to be $275,000 in cash and stock.

The Ashland Iron and Steel Company, of Ashland, Wis., has added a chemical by-product plant to its charcoal furnace property. Electricity has been largely used as motive power. The stockholders of this company are also the stockholders in the West Colby Iron Mining Company, at Bessemer, Mich. This company has been incorporated with the Ashland Iron and Steel Company, and the mine will be known as the Yale. A large body of high-grade bessemer ore has been developed. To cover the improvements and additions the capital of the Ashland Iron and Steel Company has been increased to $1,250,000. The officers are Joseph H. Berry, president, Detroit; Wm. G. Smith, secretary and treasurer, Detroit; W. H. Hinkle, acting vice-president, Ashland, Wis.; E. J. Burrell, superintendent chemical plant, Ashland; L. E. Dunham, manager furnace department, Ashland.

The Harrington & King Perforating Company states that, having moved its New York City offices to larger quarters in the Engineering Building, 145 Liberty street, it has at that office a full line of samples and all the conveniences of modern equipment, and will be pleased to welcome its many friends and customers. The company also says the output of its great plant at Chicago embraces every department of perforating work, from the finest perforations to the largest, and of such a variety of shapes of openings in light and heavy metal that scarcely any specification is beyond its reach. With the addition of new and improved machinery of its own design to meet the growing demand for perforated metal, and immediate access to a very large stock of sheets and plates, the company is in a position to fill all requirements for this work with prompt and efficient service.

Work on the erection of the power plant for the new shops of the Allis-Chalmers Company, at West Allis, Wis., is under way. The building will be 575 ft. long, 120 ft. wide and 50 ft. high. It will contain the central power station for the entire plant and also the blacksmith shop. The stack will be 175 ft. high.

The Pittsburg office of the Allis-Chalmers Company has been awarded the contract for the erection of a blowing engine at the bessemer plant of the Republic Iron and Steel Company, Youngstown, O. It will be of the vertical compound condensing type with steam cylinder 46 in. and 88 by 60, air cylinders 76 in. and 76 by 60 in.

The Allis-Chalmers Company recently shipped from its works at Milwaukee, Wis., a steel shaft 30 in. in diameter and 34 ft. long, hollow forged, with a 10-in. hole, for one of the plants of the American Steel and Wire Company, at Cleveland, O. The actual shipping weight of the shaft was 78 tons. It will be used with a 40 and 80 by 60 combined vertical and horizontal Reynolds rolling mill engine, carrying a rope wheel 23 ft. in diameter by 18 ft. face. The weight of the wheels is about 138 tons, and the total weight of the finished engine about 500 tons.

Westinghouse steam turbines are to be adopted for the electric generating station to be built for the Metropolitan Railway Company of London, the contract having been given to the British Westinghouse Electric and Manufacturing Company of Manchester, which is filling a similar contract for the Metropolitan District Electric Traction Company. There will be a general similarity in the 2 stations, and it will be easy to arrange for making them interchangeable, as far as the supply of current is concerned. This feature was required by the terms of the franchises. The Metropolitan power station will be at Neasden, in the northwest of London, and will contain 3 sets of 3,500-kw. capacity each. The Chelsea station of the Metropolitan District Railway will contain 4 sets of 5,000 kw. each. The electrical machinery for both stations will also be supplied by the Westinghouse Company. The current will be 3-phase alternating and of 10,000 volts, to be transformed in sub-stations to direct-current for use in the car motors. The matter of equipping the Metropolitan road electrically was the cause of a hard-fought battle between the Ganz polyphase and the American direct-current systems, the American system finally triumphing, being espoused by the District Railway under the leadership of Mr. Charles T. Yerkes. Steam for the immense turbines in the District and Metropolitan plants will be generated in water-tube boilers. The aggregate power of the 2 plants will be 30,500 kw. It is hoped that in 18 months the equipment will be in working order. Both roads are underground.

TRADE CATALOGUES.

Hercules steel trucks for railroad, steamship, mill and general warehouse purposes are described in an 8-page pamphlet published by the Columbus Skein and Iron Works, of Columbus, O. These trucks are described as being almost entirely of steel construction except the hickory handle grips and, it is said, will withstand the very roughest usage.

The White Star oil filter, for purifying dirty lubricating oil, is described in a little circular sent out by the Pittsburg Gage and Supply Company, of Pittsburg, Pa. In this filter the filtering surface is cylindrical and removable, so that every part of the filter may be quickly and easily cleansed. The manufacturers state that they design and install continuous oiling systems, employing duplex and multiplex types of this filter.

The Niles-Bement-Pond Company, of New York City, issues a little 24-page pamphlet showing a few of the standard types of machine tools that it makes, including lathes, planing machines, boring and turning mills, radial drilling machines, steam hammers, electric traveling cranes and crank slotting machines. The company states that it is prepared to furnish the complete equipment of a ship yard, locomotive works or general machine shop. The pamphlet is printed for distribution at the coming American Exposition in London.

The Medart Patent Pulley Company, of St. Louis, Mo., is sending out the 1902 edition of its catalogue of wrought rim and cast-iron pulleys, also shafting, hangers, friction clutches, sheaves, gearing and other power-transmitting appliances. The company states that it now has the largest pulley and shafting works in the world, and guarantees the quality of all its products. The catalogue is a pamphlet of 172 pages, containing condensed information about the long lists of devices mentioned, with prices. It is a most comprehensive catalogue of its kind.

The Foster-Coolidge automatic sampling machine, for which numerous points of merit are claimed, is described in a 16-page pamphlet sent out by Winthrop Coolidge, of Chicago, Ill. This sampler belongs to that class which makes a large reduction by successive small reductions, but unlike most of its class, the manufacturer states, while permitting the sample ore to fall directly through the parts, it retards the flow of the stream and mixes the ore before each reduction. The machine consists of a succession of moving hoppers and dividers, placed alternately one above the other. The ore is thus halved by dividing the stream in successive sections of ¼ to 3 lbs., and retaining each alternate section. Simplicity, small power required and easy replacement of parts are some of the merits claimed.

"Giant" air compressors and rock drills are illustrated and fully described in a pamphlet of 68 pages published by the Compressed Air Machinery Company, of San Francisco, Cal. The company states that its compressors are strongly built and have valves of the poppet type, though the company also builds compressors with mechanically operated valves. The compressors are of various types and for all purposes,

such as furnishing power to rock drills, pumps, hoists and pneumatic tools. The compressors are built both in the Corliss type, single or duplex, and in the straight-line type. The poppet valve used is known as the Reardon patent, and is claimed to wear evenly and admit a full volume of free air at each stroke of the piston. The company's rock drills are especially designed for hard work, are of simple design, and strike a hard, uncushioned blow. The valve motion consists of a plain slide valve operated by a tappet.

The Crane Company, Chicago, Ill., has issued its 1902 catalogue and price-list of standard, medium and low-pressure valves and fittings and steam engineers' supplies. This is a cloth-bound book, octavo, of 362 pages, and contains descriptions and illustrations of standard brass globe, angle, check and cross valves, composition and copper globe and angle valves; standard safety and throttle valves; radiator valves, standard and special brass steam and gas cocks; standard globe, angle, check and cross-over iron valves; also back-pressure patent valves, blow-off valves, expansion joints, pop safety valves, straightway valves, and cast and malleable iron fittings for gas and steam pipes. There is also a full list of brass steam fittings. The catalogue also includes a line of standard and low pressure flanged fittings of cast-iron. The company states that it has what it considers the most complete plant in the country for pipe fitting and bending, and that the methods used in its shop insure perfect alignment. Among boiler fittings priced are steam whistles, water gages, oil cups, lubricators, cocks, vacuum and pressure gages, and a full line of water-works goods and steam-fitters' and engineers' tools, either for hand or power work. The Crane Company states that it manufactures special fittings for higher pressures up to 250 lbs., and for hydraulic pressures up to 800 lbs. These are described in separate catalogues.

GENERAL MINING NEWS.

Petroleum Developments.—The April record shows that 997 wells were completed in the eastern and western oil fields, including 232 dry holes, and the new production was 12,688 bbls., says the Oil City *Derrick*. This was a gain over March of 72 wells completed and 30 dry holes, accompanied by a loss of 798 bbls. in the new production. For April 30 the count showed 492 rigs and 1,007 wells drilling, a loss of 7 rigs and a gain of 4 wells drilling, as compared with the March figures.

ARIZONA.

COCHISE COUNTY.

Calumet & Arizona.—At the annual meeting at Bisbee the following directors were elected: Charles Briggs, James Hoatson, James Milligan, John S. Dymock, Peter Ruppe, of Calumet, Mich.; George R. Tenor, Pittsburg; Thomas F. Cole, C. d'Autremont, Jr., Chester A. Congdon, Duluth.

MOHAVE COUNTY.

(From Our Special Correspondent.)

Peter White and others announce an important discovery of free gold ore in the country near the Sheeptrail Mine, on the Colorado River. They have located a number of claims.

Copper Prince.—This fine property, on Bill Williams' Fork, is being examined by a Mr. Lucas, of Cerrillos, N. Mex., and a much larger force of men may be put at work. The ores show native copper and carbonates.

Eldorado.—This gold mine in Gold Basin District will soon have a mill in operation.

Juno.—After a long idleness this mine, in Chloride District, is working a small force.

Leland.—The ore in this mine, in San Francisco District, is opening up well. A number of men are driving the tunnel rapidly.

Maddox.—Geo. C. Davis is said to have opened a rich body of ore in Windmill District. The ore carries copper and gold.

Nighthawk.—In the west drift of this mine, in Todd Basin District, a fine body of ruby silver is reported. The extent of the shoot is unknown.

Overland.—This mine, in Wallapai District, east of Kingman, is reported to show large bodies of good ore. James Jackman, the owner, has 3 tons of ore on the dump. A shaft is to be sunk on the vein.

Treadwell.—This mine, at Gold Rods, is one of a large group of claims belonging to the same company. It carries gold ore.

CALIFORNIA.

AMADOR COUNTY.

(From Our Special Correspondent.)

Rhetta Mining Company.—This company, of which W. W. Worthing, of Stockton, is president, has been given a new bond to buy the Bay State Mine at Plymouth, on which it has spent about $75,000 under the old bond. All over $3.50 per ton realized is to go to the creditors of the mine until debts are paid off.

South Spring Hill.—This property, at Amador City, recently changed hands, but John R. Tregloan remains as superintendent, a position he has occupied for 25 years. The mines are equipped with an electric plant. The Talisman shaft is 900 ft. deep, the Median 600 ft., and the South Spring Hill 1,200 ft. Seventeen men are employed.

BUTTE COUNTY.

(From Our Special Correspondent.)

River Boundary.—A decision has been rendered at Oroville in the suit of Mrs. E. Kirby vs. E. E. Potter, in which the court sustains the contention that the patent, in which the river is designated as one boundary, covers the land to the center of the river. A similar case was so decided recently by another judge, and an appeal is pending before the Supreme Court. This is one of several cases where land lying or outside the meander lines of the Feather River has been located under the mining laws.

CALAVERAS COUNTY.

(From Our Special Correspondent.)

Buffalo.—This gravel mine, about 2 miles from Mokelumne Hill, and owned by C. A. Werle, of that town, is in good gravel. The working shaft is 200 ft. to gravel, and about 900 ft. of drifts have been run. The channel is about 120 ft. wide. A 3-stamp Merrall mill crushes the gravel. Fourteen men are employed.

Dalmatia.—This mine, the Dalmatia Extension and the Alameda claims, at Esmeralda, have been bonded by Col. S. W. Payne, of San Francisco, who will reopen them.

Easy Bird.—This property, near Mokelumne Hill, R. Brown manager, is being steadily developed, and new buildings have been erected.

Gold Hill.—Arrangements have been completed to run all machinery at this mine at Angels by electricity. C. Wolff is superintendent.

Gum Boot.—C. G. Nuner, of Sheep Ranch, has started unwatering these mines, which are under bond to San Francisco men.

North Hill Hydraulic.—This mine, near Jenny Lind, has started up again, water being brought from the reservoir in Salt Spring Valley.

Parnell.—This mine, near Angels, owned by H. S. Messer, is to have its shaft sunk deeper and be thoroughly developed.

ELDORADO COUNTY.

(From Our Special Correspondent.)

Mount Pleasant Consolidated Gold Mining Company.—This is a new incorporation, formed to purchase and develop the Mount Pleasant mines at Grizzly Flat. The principal place of business is at San Andreas, and the directors are: Jules Lavaggi, of Plymouth; H. G. Stevenson, of Menlo Park; A. M. Brown, of Placerville; H. P. Morgans, of Angels Camp, and F. J. Solinsky, of San Andreas.

INYO COUNTY.

(From Our Special Correspondent.)

C. E. Shuey, C. A. Weaver, R. D. Warnock and the estate of T. H. Henebry have sold a gold property at Ballarat to a Los Angeles company, which has been organized to work it.

Buckeye.—From this mine, at Ballarat, F. L. Howard, owner, good shipping ore is being taken.

Dean & Jones.—On this mine, at Slate Range, 50 men are at work, and ore is steadily crushed.

Mineral Ranch.—On this mine, at Ballarat, recently sold by Charles Anthony to Los Angeles men, a new tram is being put in and 5 stamps are running.

Radcliff.—Fifteen stamps are working on ore from this mine at Ballarat, W. W. Godsmark, manager.

MADERA COUNTY.

(From Our Special Correspondent.)

Chalcopyrite.—C. W. Dickens and associates, of Los Angeles, have begun work in this mine, about 15 miles from Raymond.

Flying Dutchman Group.—This group, at Coarse Gold, owned by the Krohn Estate, comprises 10 claims. There is a steam hoist and Bryan mill on the property, with a 300-ft. shaft. Surveys are being made, and underground work is to begin again. The property is now under bond to S. Weil and C. A. Malon, of San Francisco.

Rex.—This mine, at Grub Gulch, Chas. M. Ward superintendent, is running a 2-stamp mill, operated by a distillate engine with Coalinga oil as fuel, the fuel cost being $2 per day. A concentrator is to be put in. The company has bonded the Crystal Springs claim adjoining.

Savannah.—There are 7 claims in this group, at Grub Gulch, Mark Sullivan superintendent, and a 10-stamp mill is kept running. The vein is quite large and of low grade, but there is plenty of water power for the mill, etc.

Texas Flat.—A cave-in has occurred in the 1,400-ft. tunnel on this property at Coarse Gold, H. A. Krohn superintendent. No one was injured. A 20-stamp mill is to be put up this season.

MONO COUNTY.

(From Our Special Correspondent.)

Golden Gate.—On this mine, at Coleville, Donovan & Brown, owners, 4 men are storing ore ready for the mill, which is to begin work May 15. A number of new claims have been located in Antelope District during the past year.

NEVADA COUNTY.

(From Our Special Correspondent.)

Brunswick.—A good find has been made in this mine at Grass Valley, C. H. Mallen, superintendent, and the mill will soon resume operations.

Consolidated St. Gothard.—Air compressors, power drills and apparatus for the new chlorination works of this mine and the Delhi, at North Columbia, G. Kartschoke, superintendent, have been shipped to the mines.

Gold Blossom.—On this mine at Grass Valley, Richard Jeffrey superintendent, after 2 years' driving in the cross-cut tunnel, the ledge has been struck, showing free gold.

Grass Valley Consolidated.—On this mine at Grass Valley, D. Coflin superintendent, the mill has started on good rock. Since the mine was cleared of water sinking and drifting have been steadily progressing and some 300 tons of ore taken out. Twenty-five men are at work. A new electric hoist has been installed and 10 stamps are to be added to the mill.

North Bloomfield.—A controlling interest in this famous hydraulic mine at North Bloomfield has been purchased by the W. B. Bourn Company. The purchase includes the ditches, pipe lines, reservoirs, etc. The same company has purchased the Kate Hayes hydraulic mines at French Corral and the Sweetland, Badger Hill and Union hydraulic mines with their ditches, reservoirs and pipe lines. Included are about 100 miles of ditches and canals and the Bowman and Pine Grove dams and reservoirs. Geo. W. Starr, of Grass Valley, is to be general manager, and J. W. C. Maxwell, of San Francisco, president. The North Bloomfield is the largest hydraulic mining property in the world, and one of the best equipped. From a single run some years since a gold bar of the value of $114,000 was made. There are over 11,000 ft. of tunnels on the North Bloomfield and 45 miles of ditch. The blue gravel is about 135 ft. deep. The ditch cost $500,000 and the main reservoir $250,000. The tunnels cost $798,000. For some years a hydraulic elevator has been used to elevate the tailings to the reservoir. The mine was worked as an open hydraulic from 1876 to 1884, when it was closed by injunction, and in that time yielded over $2,000,000. It has been worked since as a drift and hydraulic property with impounding dam, so the average output has been less. The other mines included in the purchase have all been productive and are extensive. The new owners intend utilizing the extensive water and reservoir system in connection with an electric power plant and will bring the power to San Francisco and other cities. The same company is negotiating for the Eureka Lake properties comprising much mining ground, 50 miles of ditches, several large reservoirs, etc. This is the most important sale which has taken place in the county in some years. W. B. Bourn has already large interests in mines at Grass Valley, but lives at 2550 Webster street, San Francisco, and is president of the San Francisco Gas Company.

RIVERSIDE COUNTY.

(From Our Special Correspondent.)

National Paint and Color Company.—Near Corona has been found a deposit of ochre, which is to be opened by Wm. Dyer and J. H. Dixon, who have organized this company.

Red Cloud Mining Company.—The mines of this company are some distance from Salton, and E. H. Gould, of Salton, is superintendent. The principal owner and president is S. P. Creasinger, of Los Angeles. Some bullion is produced. Reservoirs and pipe lines are being built.

SAN DIEGO COUNTY.

(From Our Special Correspondent.)

American Girl.—This mine, at Ogilby, has been sold to the American Consolidated Mining Company composed of Denver and Chicago men. Thos. Johnson has been superintendent of the mine and Geo. H. Coffin, of Pasadena, secretary. There is a mill and a 100-ton cyanide plant. The new owners will enlarge the mill and build a 10-mile pipe line to the Colorado River to obtain water. The manager for the new company is Colin Timmons.

California King.—The mines of this company, at Pichacho, are being connected with the mill on the river by a 4½-mile narrow gauge road. Rolls are to be used for crushing the ore, which is to be treated by cyanide.

Golden Cross.—Active work on this large mine, at Hedges, has been stopped for the present by Receiver A. W. Pauly, though the cyanide works will keep at work on tailings. The property is involved in litigation. Debts left by the former receiver, Isaac Trumbo, of San Francisco, have not been settled and Mr. Pauly has shut the mine down pending a court decision.

Noble.—These mines, near Julian, comprising a number of claims, have been bonded to English people, represented by J. H. Thring.

SHASTA COUNTY.

(*From Our Special Correspondent.*)

Gladstone.—This mine, near French Gulch, owned by J. H. Roberts, of Sacramento, and J. O. Jillson and L. A. Macintosh, of Chico, is to have a 500-h.p. electric plant.

Liberty Group.—This group, near Copley, has been purchased by the Great Western Gold Company, of St. Louis, Mo. There are 900 acres of land. James J. Chambers is to be manager, and a 100-ton smelter is to be erected. T. S. Henderson & Co., of St. Louis, are agents for the company.

Mount Shasta.—The new 6-stamp mill of this mine at Shasta, F. E. Ware, manager, is working steadily. An air compressor for machine drills is to be put in.

Niagara.—This mine, at French Gulch, W. T. St. Auburn, manager, is being reopened, and considerable machinery has been purchased and shipped.

South Fork Mining and Development Company.—This property, near Igo, B. F. Rogers, superintendent, has a tunnel in 1,500 ft., which is now to be extended 1,000 ft. farther. The company is cross-cutting several ledges in Chicago Mountain. Seventeen miners are at work.

SIERRA COUNTY.

(*From Our Special Correspondent.*)

Mabel Mertz Gold Mining Company.—This company has under bond the Mabel gravel mine, near Forest. A new tunnel is to be run. F. M. Sponogle is president and W. W. Barham, secretary, with office in the Parrot Building, San Francisco.

New Independence.—This company is operating the old French ledge near Moore's Flat. Geo. A. Nihell is superintendent. The mill is to be improved and concentrators, etc., added. Everything is expected to be ready in 60 days.

SISKIYOU COUNTY.

(*From Our Special Correspondent.*)

Helena Gold Mining Company.—This property, near Callahan's, James McKeen, superintendent, is working 50 men. The cyanide plant is to be enlarged so as to work about 50 tons more daily.

Klamath River Mines.—Mining is active along the Klamath River, there being plenty of water for the hydraulic and placer claims.

Tyrer Mining Company.—This property, at Klamathon, has a new 10-stamp mill, and additional machinery has been ordered.

TRINITY COUNTY.

(*From Our Special Correspondent.*)

Brown Bear.—This mine, at Deadwood, C. Dobler, superintendent, is again running a full force of men.

Chloride-Bailey.—This mine, owned by the Trinity County Gold Mining Company, Henry Randall, superintendent, is near Dedrick and has a 10-stamp mill. A 20-stamp one is being put up about 2 miles from the mine. Forty men are at work.

Duval.—A 5-stamp mill from a mine in Shasta County is being hauled to Mr. Duval's quartz mine near Carville. The mill will be run by water power.

Fairview.—This property, near Minersville, Jos. H. Porter, superintendent, is being worked under bond by the Altoona Quicksilver Mining Company with 15 men. Three tunnels have been run.

Lappin.—On this mine, at Deadwood, recently bonded to English people, a 3-compartment shaft is being sunk.

TUOLUMNE COUNTY.

(*From Our Special Correspondent.*)

Black Oak.—This large producer, at Soulsbyville, W. A. Scott, superintendent, is putting in a new and larger hoist.

Clio.—Jos. M. Cox, of Boston, has purchased this claim from Perry, Potter & Heath, and is paying off the claims and liens.

Horseshoe Bend.—These mines, on the Tuolumne side of the river, opposite Melones, are having new buildings, etc., put up.

Longfellow.—Dr. J. L. D. Roberts, of Monterey, principal owner of this mine at Big Oak Flat, has put a small force at work. The water will be pumped out, the shaft retimbered and the mine put in order.

Rawhide Gold Mining Company.—The App Consolidated Mining Company has transferred all its Tuolumne County property, except the New Albany mine, to this company. The transfer includes the Rawhide and App mines and mill sites, the Heslep and Hitchcock quartz mines, and the Martin Nevills and Ballard placer mines. The consideration is stock in the Rawhide Company. W. A. Nevills is the principal owner.

Two Brothers.—This mine, near Big Oak Flat, has been sold to San Francisco men, who will put in machinery.

COLORADO.

CHAFFEE COUNTY.

(*From Our Special Correspondent.*)

Ohio & Colorado Smelting and Refining Company.—Work on this new smelter, being erected at Salida by the owners of the new Monarch Mine, at Leadville, is progressing very satisfactorily. The plant is very substantial. Manager Goodwin is getting the best equipment, and over $200,000 has been expended to date. The plant will contain 4 lead furnaces, of 150-ton capacity each, and a matte furnace of 250 tons. The big 530-h.p. engine in the power-house was used at the Buffalo Exposition. The 3 boilers, already in place, are 200-h.p. each. The flue chamber will be 675 ft. long, and the stack 150 ft. high. The power-house is 80 by 160 ft., and the main furnace room 40 by 120 ft., all built of brick with cement floors. The company has 100 acres of ground. It is erecting bins for the storage of 50,000 tons of ore, and will work 200 men when completed. It expects to blow in a lead furnace by July 1. It will ship 300 tons a day from the Monarch Mine.

CLEAR CREEK COUNTY.

Shafter.—The shaft house on this mine, near Idaho Springs, burned down on the night of April 30. The property is owned by New York City men. The loss is estimated at $4,000.

FREMONT COUNTY.

United Oil Company.—Well No. 173, near Williamsburg, struck oil at a depth of a little more than 2,200 ft. This well has produced for some time from a depth of 1,910 ft. Two wagon loads of oil well supplies have been taken out to the site of the New England Consolidated Company in Garden Park.

GILPIN COUNTY.

(*From Our Special Correspondent.*)

Mining Deeds and Transfers.—The Carcassonne Gold Mining Company to the Bertha Gold Mining and Milling Company, the Carcassonne lode, Pleasant Valley District; Rich Rock Mining and Milling Company to Jonathan G. Stokes, the Rara Avis, J. P. Whitney and Little Mack lodes and Rara Avis mill site, Eureka District; C. M. Pishon to D. Zancanella, the Austria, Silver and Fraction lodes, Russell District; R. L. Parrish to the Blue Grass Mining Company, one-half interest in Decoration lode and the Blue Grass placer claim, Phoenix District.

Gilpin Shipments.—The total shipments of smelting and crude ores, concentrates and tailings to the smelters and outside points of treatment from the Black Hawk depot in April were 405 cars, or 7,495 tons, the largest shipment in the history of the county. As compared with 1901, last month's shipments were 148 cars, or 2,740 tons in excess, showing a gain of over 60 per cent.

Specie Payment.—The shipments for April were 93 cords of milling ore equivalent to 800 tons, and 105 tons of smelting ores, of the usual good grades. The property is operated by Rhode Island parties and last month paid its 4th dividend of 2c. per share. E. W. Williams, Central City, is manager.

Charter Oak.—St. Louis, Mo., parties, who are the owners, are making arrangements for resuming operations. The machinery has been overhauled, and as soon as the shaft can be re-timbered sinking will start, with the intention of putting the 400-ft. shaft several hundred feet deeper. E. W. Davis, of Central City, is manager.

Denver & Boston Consolidated Mining and Milling Company.—The east 2 sections of 20 rapid-drop stamps are to be overhauled and new Woodbury concentrating tables added, 6 to each battery. L. H. Stockbridge has resigned as manager, wishing to retire from active life, and O. B. Thompson has been appointed in his place. The properties are reported to be in fine shape, and the company has plenty of funds on hand. The Cook shaft is to be sunk 300 ft., to connect it with the lower levels of the Fisk and Gregory-Bobtail properties.

Independent Sampler.—Local parties principally have organized a company, with a capital stock of $50,000, to operate an independent sampling works on account of the recent merger which absorbed all the sampling works in Gilpin, Clear Creek and Boulder counties. The new sampler will be of 100 tons capacity, and is expected to be in running shape the first week in June. D. H. Allen, formerly manager of the State Ore-Sampling Works at Black Hawk, will be manager, the new works adjoining the Gilpin Mill at Black Hawk.

Justice Leasing Company.—This company, with a capital stock of $10,000, has been formed to work the Justice Mine, in Lake District. Incorporators, Herbert D. Wellington, Jr., Fred A. Thompson and William Russell.

Lone Star.—Denver parties have taken a lease and bond on this property, in Enterprise District, and will install machinery. Some high-grade silver ore was taken out of this mine in its early days. Alton Hopkins, of Black Hawk, will be in charge.

National Tunnel, Mining and Milling Company.—Work has started upon the Illinois Mine, in Lake District, and the shaft is to be sunk several hundred feet deeper. C. M. Baldwin, of Black Hawk, is manager.

Rocky Mountain Concentrator and Mill.—E. S. Moulton and J. A. Emery, of Boston, are at Central City in the interests of the Eastern purchasers. The amount of money paid to the English owners, including amount to be put in repairs and new machinery, is given as $35,000. New rollers and crushers, Wilfley & Bartlett concentrating tables are to be installed, and the capacity of the plant will be enlarged. The concentrator and mill are to be used mostly for custom work, and will also handle the product of the Nemeha group of mines on Bobtail Hill, also owned by the Easterners. E. S. Moulton, of Central City, is manager.

LA PLATA COUNTY.

Coal Miners' Strike.—About 250 men employed in coal mines near Durango have struck because the operators failed to adopt the scale submitted by the miners some weeks ago. It contained these rates for the respective mines: Inside work for 8 hours, $3; Monero, tonnage, 75c.; Porter, 75c.; Hesperus, 70c.; City and Champion, 75c., for coal measures of 2½ ft. and 80c. for under that thickness; Boston, 62c., and an advance of 10 per cent on yardage. The scale provided for 2 pay days a month; for outside work not less than $2.50 a day; 8 hours in all cases to constitute a day's work; miners not to be allowed to go in any mine on their idle time or lay off days to prepare ground for digging. The wages paid in this county have always been regarded as above the average for coal mining. Eight hours has been the vogue at all leading mines since last year, with $3 per day for all inside men working on time and $2.50 for outside men, except at the Boston Mine, where $3 is paid both inside and outside.

Durango Oil Company.—This company has started work near Durango. The machinery, casing, etc., is on the ground to sink 3,000 ft. An oil man from Ohio is in charge.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

Leadville Ore Output.—The April tonnage was 65,000 tons, an increase over March of 5,000 tons. This comes from the Leadville Basin mines, 650 tons daily; Carbonate Hill, 250 tons daily; Breece Hill, 525 tons daily; California Gulch and Iron Hill, 475 tons daily; Fryer Hill, 75 tons daily; zinc tonnage, 125 tons per day and outlying districts 75 tons. May is opening with an increase, the production for the first week of the month will average 2,500 tons per day.

Zinc Ore Situation.—There is much improvement in the zinc situation, and an increased tonnage is reported. The new mill to be built at the A. Y. & Minnie Mine by the leasing company, headed by Newhouse, Rodman & Nicholson, will be ready for work before June. It is likely that a magnetic process of separation will be tried. The mill will have a capacity of 100 tons daily. It is also stated that the new plant at Pueblo, being erected by the United States Zinc Company, will be pushed to completion this year.

Electrical Power.—It is learned on good authority that application will be made within 30 days to the city of Leadville for a franchise for an electric railroad line and electrical extensions to furnish power to mines and smelters. New York capital is behind the proposed enterprise.

California.—This Granite property has been sold to Colorado Springs parties for $4,000. The new owners will open it extensively, and ship this month from work already begun.

Forest City No. 2.—In sinking the shaft below the old workings on Little Ellen Hill 2 ft. of ore is showing in a new drift at 150 ft. The stuff averages $35 to the ton, and is mined by the Forest City Leasing Company.

Fryer Hill Mines Company.—Preparatory work has started. A large part of the heavy machinery of the old Elkhorn Company has been purchased, and a new 1,400-gal. pump will be purchased and put in. Manager Newell figures that it will take at least 3 months to lower the water through the old El Paso shaft. When the old Union and Leasing Company operated the greater part of this territory, some 7 years ago, they took out over $1,250,000 in something over a year. Large bodies of low-grade ore were left standing, while the lower contacts have never been developed. Among the big claims of the new combination are the Bangkok-Cora-Belle, Jamie Lee, Fore-

paugh, Alpha, Constance, Tip-Top, Dunkin and a number of others.

Greenback Mining Company.—At a depth of 1,330 ft. the shaft is still going through the new sulphide streak. At 1,350 ft. connections will be made with the old ore shoot by a drift. The company will then be able to ship 200 tons daily.

Ibex Mining Company.—The management has about closed new contracts with the American Smelting and Refining Company to increase shipments of sulphides by 150 tons a day from the company's 3 shafts.

Independence.—A new tunnel has been started to cut the sulphide zone at a greater depth. The ore is a copper sulphide.

Last Chance.—Local men have secured a long-time lease on this mine and put in a new plant of machinery to sink the shaft another 200 ft.

May Queen.—Lessees have sunk a new shaft 125 ft., and are drifting in good-looking contact.

New Leadville Gold Mining and Milling Company. This company is operating the Gilt Edge and Helen claims on Rock Hill, and is preparing to sink a diamond drill hole on 90 acres of well-located virgin territory in the Tennessee Pass section.

Robinson Smelter.—The construction crew has completed its work, and machinery is being placed rapidly in position. The company will blow in about May 15. The ore handled will come largely from the Robinson Mine and surrounding territory.

St. Kevin.—Frank Lomeister and others, of Leadville, who have this mine under lease, have opened a new strike of stuff that runs 100 oz. silver at a depth of 100 ft. in a 90-ft. drift.

Sierra Nevada.—This good piece of ground is operated through the Yak tunnel. It was recently sold by Reynolds & Hannifen to Kansas City parties, who expect to develop it on a much larger scale. They have zinc-sulphide ore.

Small Hopes Consolidated Mining Company.—In addition to a steady tonnage from the Emmet, Forest City, Kearns and other shafts, of the Small Hopes Company, operated by lessees, the company proper now increases its tonnage by 60 tons daily of sulphides from the Marian shaft of the R. A. M.

Sunset.—Philadelphia people, who have a lease and bond, have let a contract to drive the tunnel 350 ft.

Ten-Mile Mining Company.—The new strike shows up very encouragingly, and the drift has been carried 35 ft. through the ore, with an average thickness of 7 ft. The stuff runs 30 oz. silver and also carries good values in lead and gold.

Valley Leasing and Mining Company.—The new shaft is going down on the Forest Rose territory to open the gold belt ore shoot. A fine plant of machinery is in position. Springfield, Mass., people are back of the enterprise.

Washington Gold Mining Company.—The company has its Washington shaft in the Granite section down 180 ft., and is working from 3 levels along the 3-ft. vein. The company is also shipping mill dirt to the concentrating plant at Canon City, while shipments from the vein range from $60 to $116 a ton. C. C. Hamlin, of Colorado Springs, is president.

LARIMER COUNTY.

Oil Wells.—The Sanborn well, at Fort Collins, caved in at a depth of several hundred feet. In the Beach and Canfield wells drilling ceased on account of the hard formation encountered.

MESA COUNTY.

De Beque Oil Fields.—During a high wind storm on May 3 the derrick of the Home Oil Company was blown down and smashed. This will cause a delay of a couple of weeks. The drill at the Wheeler well is in gritty sand at 790 ft. The hole is perfectly dry.

SAN MIGUEL COUNTY.

(*From Our Special Correspondent.*)

Four Metals Mining Company.—This company is doing much development work near Telluride, and the stockholders contemplate erecting a 100-ton stamp mill. At the Palmyra, 2 tunnels are being driven; the upper one is now in 1,000 ft., and the lower nearly 800. For the past 6 months mineral in the lower tunnel has been carrying more gold, and now the values are said to equal those of the silver and lead combined. The 2 tunnels are connected by a raise from which drifts have been run both ways on the vein.

The mill in Turkey Creek Basin was destroyed by fire April 27, causing a loss of $15,000. Work in the tunnel is temporarily stopped. The mill was not running, but was used as a converter house, the power being used to drive the large fan which furnished air for the men in the tunnel. The fire was caused by the electric wires becoming crossed. New converters have been orderd, and within a few days work on the tunnel will be resumed.

Japan.—Carpenters are rebuilding the structures destroyed by a dynamite explosion last February, and as soon as the compressor is installed work in the tunnel will be pushed. There will not be much mining done this season on account of the large flow of water struck 2 years ago in the 3d level. The tunnel will drain the mine.

Keystone Placer.—Sluice boxes are in place and 2 hydraulic giants are washing down gravel. Values are from 10c., near surface, to $1.50, near bedrock. The company owns 640 acres of ground near Telluride, and preparations are being made to work on a large scale. The claims have been thoroughly tested. H. A. Brigham is now the superintendent, succeeding Col. T. B. Ludlum, who was killed by a stream of water from one of the large 10-in. giants. Mr. Brigham has had experience in California, South Africa and Burma. C. M. Coleman, secretary and treasurer of the company, reports work progressing satisfactorily.

New County Road.—As soon as the necessary arrangements can be made, work on this enterprise will start. The Bank of Telluride secured the 6 per cent $35,000 bonds voted for building the road. The bonds sold for $35,700. It is doubtful if the road can be completed before next spring, as it will be over 5 miles long and cross some of the most rugged mountains in this part of the Rockies. It starts in Telluride, at the head of Oak street, at an elevation of 8,900 ft., and from there it will be carried across gulches and by tunnel through mountain ridges to its objective point, 11,870 ft. above tidewater. It will save thousands of dollars in moving machinery, supplies and ore.

Ophir-Consolidated Mining Company.—A cross-cut tunnel has started at the mill, near Ophir, to intersect the Butler and Silver Bell veins at 1,000 ft. below the 6th level, the lowest present workings. The work is now by hand, but the company has purchased the air compressor, boilers and other equipment of the Meldrum Tunnel and Mining Company, and will use machine drills. Senator W. S. Buckley, the manager, has been in Denver awarding contracts for machinery for the new mill. Grading for the plant is under way and carpenters are framing the timbers.

Peck Cyanide Company.—This company began work May 3 in the large plant near Pandora. The small one outside of the city will be enlarged, and may not be started for 2 months. The company is treating tailings that have been accumulating for years from the Tomboy and Smuggler-Union mills.

The company is involved in a lawsuit with the Smuggler-Union and Liberty Bell Mining companies on account of tailings from the cyanide plants of these corporations settling on the ground. The tailings are worthless and must be put through the same process as those that contain values. W. E. Gill is manager and William Royston is superintendent.

Tomboy Gold Mines Company.—It is reported that this company has purchased the Columbia-Menona mines instead of the bond and lease as stated. The price paid is reported as $150,000; $30,000 has been paid and the balance is due in 2 years. A large force of men is already busy in development, and the company intends to drift east on the Columbia vein and intersect other promising veins.

Turkey Creek Mines.—Work on the Sioux Mine is progessing very satisfactorily. The tunnel is in over 1,300 ft., and is expected to reach the Sioux vein in 150 ft. The vein is from 2 to 16 ft. wide and runs strictly in gold. Manager J. S. Shockley, of Telluride, made a mill run on 50 tons taken from near the surface and the clean-up showed the ore to average $10 per ton. Never before has San Miguel County seen such bright prospects as now. New building is contemplated at nearly every mine of importance in the district, and new companies have been organized to work in new territory. It is believed by many of the most conservative mining men that the gross output of mineral for this year will greatly exceed that of last, when, according to the report of Harry A. Lee, San Miguel County ranked second in the production of gold.

TELLER COUNTY—CRIPPLE CREEK.

(*From Our Special Correspondent.*)

Jack Pot Mining Company.—At a meeting of the stockholders, recently held, the proposition of selling the Gettysburg claim to the Jennie Sample Consolidated Company, was voted on favorably. The price was 260,000 shares of the stock of the Consolidated Company. The Jack Pot Company still has several claims left, as well as the stock in the Consolidated Company and a large block of Doctor-Jack Pot stock.

Mt. Rosa Mining, Milling and Land Company.—A special meeting of the stockholders was held this week for the purpose of re-incorporating the company under the laws of Wyoming. This is done in order to make some changes in the charter. The company owns the Mt. Rosa placer, the town site on which the town of Victor is built. The company is controlled by the Woods Investment Company. A suit recently filed against the company by some of the minority stockholders has not been set for trial yet.

New Sampler.—The new Taylor & Brunton sampler on Bull Hill has been completed and is ready for business. The new sampler is near the Y on the Midland Terminal Railroad and is connected with the tracks of the new Shortline Road. The old plant will continue in operation. A deal was recently on foot to consolidate all the samplers in the Cripple Creek District, but is understood that the Taylor & Brunton people decline to enter the combination. The new sampler is arranged so that the ore can be handled automatically, this being an improvement over the old one. The sampling device used is the Brunton sampler patented by D. W. Brunton, the well known mining engineer.

Stratton's Independence, Limited.—A Scotch mining engineer, Daniel MacLaren, who has been making an examination of this property, has finished his work and left for San Francisco. While nothing definite can be learned of the results of his investigations it is currently reported that he found the conditions of the property much more encouraging than John Hays Hammond in his last report. It is generally understood that Mr. MacLaren has been doing this work in the interests of some of the Scotch stockholders. The publication of this report is waited with interest. In the meantime the mine is taking out considerable ore.

GEORGIA.

CATOOSA COUNTY.

(*From Our Special Correspondent.*)

Salt Well.—A few months ago R. B. Bagwell, while engaged in putting down a bore-hole near Lytle, for the purpose of obtaining water for domestic purposes, struck at the depth of 212 ft. from the surface what appears to be a considerable supply of salt water. The well is located just beyond the eastern margin of Chickamauga National Park, and within a short distance of Chickamauga Creek. The rock well, from which the water flows, is the Chickamauga limestone, a comparatively pure limstone forming the upper division of the Lower Silurian. This formation, according to C. W. Hayes, has a thickness of about 1,000 ft. It is one of the main valley-making formations of North Georgia and East Tennessee, but at no other point, so far as known, does it yield saline waters.

The water, according to Prof. J. M. McCandless, State chemist, contains 5.41 per cent of sodium chloride, together with a rather high percentage of other salts. Its commercial value depends largely upon its quantity. The capacity of the well is unknown, as no test has been made by pumping. The water rose to within 80 ft. of the surface. Mr. Bagwell is now in communication with some northern parties who are considering a thorough investigation of the water.

IDAHO.

BEAVERHEAD COUNTY.

Daniel B.—A find of high-grade tellurium ore is reported in this claim near Argenta, owned by T. Erhart. The pocket was small.

IDAHO COUNTY.

Cracker Jack.—Manager Stevens has the building up for the mill at Hump, and all the machinery is on the ground except the mortars. The building and power is sufficient for a 10-stamp mill, but only 5 stamps are to be installed at present. The mine is developed by a 300-ft. adit level, the face of which has a depth of 150 ft. A contract has been let to make an upraise from the face-level to the surface. The ledge is from 12 to 20 ft. wide.

Jumbo.—In starting a raise from the No. 1 level to the surface at this mine at Hump the miners encountered 4 ft. of ore said to mill $180 to the ton. It is claimed to be the richest ore body of any size ever struck in the camp.

Thunder Mountain District.—Prospectors and others are ariving at the camps in this region in increasing numbers, though the trails are now in bad shape from the melting snow. Supplies of all kinds, except water and timber, are scarce. According to the best information available there is a large amount of low-grade rock in the region, with irregularly scattered streaks carrying high values. The country has been staked for miles. Probably a majority of the locations were made when the ground was deeply covered with snow. It has been reported also that some of the early locators have sold the same claim several times to different parties. Under these circumstances there is likely to be a lot of litigation.

Wise Boy.—The 10-stamp mill for this mine at Hump is on the ground, except the battery, and is expected to be running by July 1. There are 25 men on the payroll at present. The property is developed by a 100-ft. cross-cut that strikes the ledge at a depth of 65 ft. and by a drift 120 ft. to the north. In several places the ledge is reported to show a width of from 18 to 25 ft. A cross-cut has been started to give a depth of 350 ft. and is in 100 ft. W. E. Kelly is manager.

LEMHI COUNTY.

Lignite Discovery.—It is stated that within the last 2 months 3 or 4 workable deposits of lignite of good quality, from 4 to 7 ft. thick, have been found in the

Salmon and Lemhi Valleys. The coal is of the Payette formation of the Miocene.

Lillie.—This group of 6 claims on Indian Creek, not far from Salmon, has been developed by about 1,200 ft. of tunnels. Most of the ore is iron pyrite carrying considerable gold. The veins best opened are about 4 ft. wide and run $5 to $7 per ton.

SHOSHONE COUNTY.

Coeur d'Alene Mining Company.—It is stated that Manager Brown, of Murray, has decided not to install the machinery brought in last winter, as at present there is not enough power to operate it, but the hydraulic elevator is being moved and the washing of gravel will begin as soon as it is in place at the upper end of the pit worked out last year. About 35 men are at work, and within a month the force will probably be increased to about 150. The old Coulter flume will be rebuilt and the water of Prichard Creek will be taken farther up the stream, adding some 200 ft. to the head available.

Mammoth.—The raise from the No. 6 tunnel in this mine, at Wallace, has broken into the upper works. The distance between the 2 levels is about 600 ft., and as soon as the raise is timbered and ore chutes put in all the ore from the mine will be taken out through the No. 6 tunnel.

WASHINGTON COUNTY.

Denver & Chicago Mining Company.—This company is opening mines on Rapid River, north of Council. It has been getting out lumber during the winter and proposes to build a 10-stamp mill this summer. W. B. Wright is superintendent.

INDIANA.

(From Our Special Correspondent.)

Weekly Wage-Payment Law.—The Republic Iron and Steel Company, of Anderson, Ind., is attacking the constitutionality of this law, and has brought an appeal to the Supreme Court. The company says in part in its brief: "If the only persons concerned, the employer and employe, may not lawfully come to a mutual agreement for a bi-weekly pay day, and the Legislature is to be the sole judge of their power to contract and of the reasonableness of their agreement, there is nothing to prevent the legislative prohibition of all wage contracts and the enactment of a law requiring labor to be paid daily, or by the piece, as each piece is finished, and at a rate of compensation which the Legislature may fix." As common carriers engaged in Interstate commerce are excepted from the provisions of the law, the brief says: "The Atlas Engine Works, at Indianapolis, conducts the same business as that which is carried on in the Big Four Railway shops, namely, making engines. Each employs 1,000 men. The Atlas Engine Company must let the Legislature make its wage contract as to pay day, while the men employed in the railroad shops are free from legislative interference."

The case will be watched with interest, as the miners of Indiana are demanding a weekly pay day and the operators insist on paying twice a month.

KANSAS.

LA BETTE COUNTY.

(From Our Special Correspondent.)

Zinc Smelter Sold.—On May 3 the New Jersey Zinc Company bought the C. C. Cockrell and Prime Western zinc smelters at Gas City. The purchase price is understood to be $540,000. The sale was consummated by Edward H. Mower, general manager of the Empire Zinc Company, which is controlled by the New Jersey Company. The New Jersey Zinc Company will at once add 2 new blocks of furnaces. The past capacity of the 2 plants has been 700 tons of ore per week. The new company has secured a large amount of gas land, and there is talk of erecting a zinc rolling mill, acid works and, possibly, a gold and silver smelter. The consolidation brings a formidable competitor in the field to the Lanyon Zinc Company and the Edgar Zinc Company, which now purchase the bulk of the ore of the Joplin zinc district. The capacity of the Lanyon works is 1,500 tons of ore per week, and of the Edgar is 1,000 tons of ore per week. C. C. Cockrell has been retained as the general manager of the two Kansas plants. The Empire Zinc Company, formerly operated a coal smelter at Joplin, Mo.

KENTUCKY.

MC CRACKEN COUNTY.

Owens Cave.—A Paducah syndicate composed of S. B. Hughes, E. T. Woolfolk, T. S. Du Bois, George C. Wallace, Joseph L. Friedman, William Eades, Geo. Rock, J. W. Bloomfield and W. F. Paxton have bought 135 acres of land 12 miles above Paducah, on Cumberland River to open a lead and fluorspar mine. A mine was started on the land before the war, but abandoned.

MICHIGAN.

COPPER—HOUGHTON COUNTY.

(From Our Special Correspondent.)

Atlantic.—The product for April was 319¾ tons of mineral, the largest in the history of the mine. The recent resignation of William S. Tretheway, head mining captain, has resulted in a general promotion. John Stratton has been appointed head mining captain, William Bartlett under captain, and Thomas Stratton second captain.

Baltic.—The production during April amounted to 311½ tons of mineral. The drifts south of No. 2 shaft are in good ground. North of No. 5 shaft excellent rock is opening up, also a large amount of mass and heavy copper. Nearly 25 per cent of the output of the mine is secured from mass and barrel work, which goes direct to the smelters without any stamping. At the mine 6 boarding houses and 6 dwelling houses are under construction.

Franklin.—A mass of copper, weighing 13½ tons, was recently encountered and hoisted from the 29th level of No. 5 shaft at the old mine. Twenty-five drills are in use at this part of the property, which produces 500 tons of rock daily, or enough to supply a stamp at the mill. The April output was 317 1-5 tons mineral.

Globe.—The diamond drill operating on this property, next south to the Champion Mine, owned by John Stanton, of New York, has been moved. The last hole is 1,060 ft. deep.

Isle Royale.—A cross-cut from No. 1 shaft at the 9th level has struck the Grand Portage amygdaloid lode. No. 1 shaft is now down 65 ft. below the 16th level.

Wolverine.—Six 4-ton skips are being made and will be installed in Nos. 3 and 4 shafts as soon as completed. The skips now in use hold only 2 tons each. The product for April was 255 tons of mineral.

COPPER—KEWEENAW COUNTY.

(From Our Special Correspondent.)

Mohawk.—Sinking in No. 1 shaft at this mine has been resumed. The shaft is down to the 6th level and will be sunk to the 7th.

Phoenix.—The railroad leading from the mine to the stamp mill site on Eagle River will go into commission June 15. The grading is about finished, and the rails are expected to be delivered soon. The construction of a narrow gauge railroad, 4 miles long, from the stamp mill site to the Bollmann logging road has been decided upon, and the preliminary survey is being made. The road will give the mine all-rail connection with Calumet, effecting a big saving on freight, formerly hauled by team some distance. The rolling stock owned by the Wolverine Mining Company has been purchased and will be used on the Phoenix extensions.

COPPER—ONTONAGON COUNTY.

(From Our Special Correspondent.)

Mass.—The entire output of mineral of this mine is refined at the Quincy Smelting Works. No steps toward the construction of a smelter have been taken. The miners are out on a strike for higher wages.

IRON—MARQUETTE RANGE.

Republic.—Mules have been taken underground at No. 9 shaft of this mine at Republic to haul ore from No. 1 to No. 9 shaft, a distance of nearly ½ mile.

MINNESOTA.

(From Our Special Correspondent.)

Iron ore shipments for April from the 3 Minnesota ore roads have been 900,000 gross tons of ore, about two-thirds of the entire shipments of the upper lake region. The Duluth & Iron Range road alone moved 440,000 tons off its docks, but hauled to docks 85,000 tons more.

Shipments from all Lake Superior ports, not including Escanaba, North Escanaba and Gladstone, for April were 1,332,000 gross tons. This is close to 300,000 tons more than the shipments of 1901 up to June 1, and gives an indication of the way in which business has started.

Some explorations are promised this season in the eastern extension of the Mesabi Range, in Lake and Cook counties, where little or nothing has been done for many years. The Johnson Nickel Mining Company, which has done work in the past, claims to have found a large tonnage of magnetic ore, claimed by the company to be free from titanium. The North American Iron Company, a Chicago concern, that fell heir to the old Paulson development in T. 65, R. 4, has done some work since it took possession, but for the past year has been idle. It is now preparing to pump out its workings for examination by a possible purchaser. There is claimed to be considerable banded magnetite shown. Some other showings are under negotiation.

The new No. 5 docks of the Duluth & Iron Range road will not be completed for more than a month yet. It was under contract to be ready May 1, but the difficulty of getting material has handicapped the contractors.

IRON—MESABI RANGE.

(From Our Special Correspondent.)

Five churn drills are working on lands in T. 56, R. 25, near the Mississippi River, by Watson Brothers, of Minneapolis.

Several drills will be worked in sections 1, 2, 3, 4 and 10, T. 55, R. 25, by Wallace and others, of Duluth.

Biwabik Mining Company.—This company has started a shovel in ore and also in the stripping. The north side, the big bank above the ore, will be stripped back some distance. The mine will make very heavy shipments.

Cloquet.—The Duluth & Iron Range road is tearing up its tracks to this mine, at Eveleth, and the ore from that property will hereafter be hauled via the Duluth, Missabe & Northern road.

Commodore.—The accumulated stockpile of several years ago is being shipped from this mine, at Virginia. Nothing else will probably be done this year. The situation is the result of a game of freeze-out between the fee-owner and the lessees. The latter claim they cannot work at a profit on the royalty charged. The former refuses to reduce the royalty of 33c. a ton.

Deering Harvester Company.—This company will open its recently purchased lease in section 32, T. 57, R. 22, as soon as the Eastern Railway has built in a road, about 10 miles long, comprising some pretty heavy work. Jos. Sellwood will have general supervision of the mining operations, a guarantee that they will be rushed and conducted skilfully. The mine will provide some of the ore for a steel plant to be erected by the Deering Company at a point near Chicago, the plant to be especially designed for making small angles, plates and beams.

Interstate Mining Company.—This company has started shipping from its Lincoln Mine at Virginia, and is sending out about 3 cars daily. The amount will be increased. Its Grant Mine will also ship in a very short time. The Lincoln ore is of very fine grade and satisfactory to the owners, Jones & Laughlins, Limited. Explorations on the n. w. part of section 16 and the s. w. part of section 9, T. 58, R. 19, are showing very well.

Minorca.—At this mine, where the Duluth & Iron Range built a track last year, it has let contract for additional trackage there and will haul that ore this year. The mine is now being prepared for shipping.

Oneota Mining Company.—Explorations are to start upon the lands of this company shortly, options running for 9 months having been given this week to representatives of an Eastern interest for a royalty of 20c. a ton. The Frazer lands, joining the Oneota, are included, and will be explored. These lands lie close to the old Mallman Mine, which showed some low-grade stuff, and has been gone over unsuccessfully by both the Oliver Iron Mining Company and by Jones & Laughlins. It is supposed by some that the Oneota lands present a more favorable opportunity.

Snyder-Oliver Mining Company.—At this mine sinking a second shaft has started. The first is in ore, but so much water has been met with that it was thought best to open a second shaft immediately. Railroad tracks to this mine are being put down, and some ore will be shipped this year. Some exploring will be done, it is stated, at a point 6 miles north of Hibbing, where some indications of iron have been met.

Stevens.—A steam shovel has been taken in and will be worked in the stripping, being done without contract by the Minnesota Iron Company, which has the operating contract.

Williams Estate.—Drilling operations on the old Chicago property have stopped and the property is abandoned. The estate is to explore a tract in the n. w. of section 9, T. 58, R. 16, near the McKinley Mine. It owns also some lands east of the Biwabik Mine that may be explored later. The Williams Mine, joining the Biwabik, is its property.

MISSOURI.

JASPER COUNTY.

(From Our Special Correspondent.)

Joplin Ore Market.—The past week was notable for the breaking of the pool, which for 4 weeks had been hoarding one-tenth of the highest zinc ore of the district in an effort to gain a flat rate of $37.50 per ton. The determination of the pool to sell threw on the market 3,000 tons of such ore. Two-thirds of this amount was purchased by the Lanyon Zinc Company, and the rest was divided among other smelters. The pool sold its ore on a basis of $30 for 60 per cent ore. The ore assayed higher than 60 per cent, and the reserve stock brought $100,000. This was the heaviest sale of ore made in one day in the history of Joplin. The highest price ore sold this week was the Excell, in Joplin, which brought $34 per ton. This ore was not loaded. A large amount of Joplin sales run from $32 to $33. Lead ore is stationary at $43.50 per ton.

Compared with the preceding week, last week's shipments show an increase of 1,319 tons of zinc and 43 tons of lead, with an increased value of $41,425. In the corresponding week last year the shipments were 430 tons of zinc and 67 tons of lead, and the

value was less than last week by $1,504. The value of ore shipped the first 18 weeks this year is $406,540 greater than during the same period last year, although the shipments have been 145 tons of zinc and 41 tons of lead less.

The sales reported from the various camps of the district for the week ending May 3 were as follows:

	Zinc, Lbs.	Lead, Lbs.	Value.
Joplin	2,679,720	323,960	$49,992
Galena	1,628,180	134,670	24,899
Carterville	2,260,210	488,880	41,146
Webb City	329,620	15,230	4,781
Aurora	761,200	19,590	10,110
Spurgeon	330,020	80,660	5,627
Central City	211,630	2,610	2,702
Oronogo	360,620	10,680	5,645
Zincite	230,750	20,450	4,023
Cave Springs	289,010	13,810	4,491
Reeds	241,380	.....	3,621
Sherwood	55,090	28,560	1,147
Duenweg	318,070	29,330	5,001
Alba	340,680	.....	5,110
Neck City	1,092,190	.....	17,475
Stotts City	82,140	.....	1,273
Carthage	80,290	.....	1,245
Carl Junction	162,460	.....	2,518
Granby	375,000	43,000	4,650
Sarcoxie	46,210	.....	693
Wentworth	65,220	.....	978
Springfield	66,000	.....	990
Harrison, Ark.	44,340	.....	266
Total	12,050,030	1,211,430	$198,503
Total, 18 weeks	181,459,990	22,773,340	$3,013,695

Zinc value for week, $171,192; lead, 26,311; zinc value, 18 weeks, $2,521,096; lead, $491,528.

Hall Lease.—Thomas Hall and James Luke have sold the lease on the 40 acres on which the Mignonette Mine, near Carthage, is located. Hall parted with all his interest, and Luke with one-half of his. The consideration for the 10-year lease was $15,000. It was purchased by Thomas Bofley, of Chicago, who represents a syndicate of English investors. The Mignonette Mine is owned by the Waddell Zinc Company, which prospected the ground 2 years ago and built the mill 1 year ago. Since the mill was erected the company has taken out $90,000 worth of ore.

MONTANA.

CASCADE COUNTY.

Boston & Montana.—This company has begun the erection of another matte furnace at Black Eagle Falls, which, when completed, will cost about $50,000. At present there are 4 matte furnaces working at the plant, and the addition means an increase in the capacity of 25 per cent.

FLATHEAD COUNTY.

Blacktail Gold Mining and Milling.—The 10-stamp mill, near Libby, erected late last fall and damaged by a snowslide during the winter, is ready for work. A. J. Moore is superintendent.

MADISON COUNTY.

Bell.—Gov. L. B. recently shipped some good gold ore from this mine, near Virginia City, to the East Helena Smelter.

Boss Tweed.—This mill at Pony is receiving material for the new tramway.

Sand Creek.—There has been a rush to this district on account of alleged rich finds of gold. The country has been staked for miles, but reliable reports as to the value of the finds are lacking.

U. S. Grant.—This claim and the Fairweather, in Fairweather District, have been bonded to W. M. Brown, by J. M. King, for a sum named as $40,000, the last payment to be made by June 1, 1904.

SILVER BOW COUNTY.

Pennsylvania.—The State Supreme Court has issued an order in this case in which the Boston & Montana Mining Company is the plaintiff and the Montana Ore Purchasing Company is defendant, enjoining the Montana Ore Purchasing Company from working the veins in the disputed territory known as No. 1 and No. 7, and from working any of the ground south of the vein known as the Johnstown vein, in Judge Clancy's injunction order.

NEW MEXICO.

GRANT COUNTY.

(From Our Special Correspondent.)

Aberdeen Company.—This company, operating a concentrator and mines at Lordsburg, has gone into liquidation and will be reorganized under the name of the Aberdeen Consolidated Gold and Copper Company.

Colorado Fuel and Iron Company.—Regular daily shipments of 26 car-loads of iron ore are made from the mines at Fierro.

Empire Copper Company.—This company is developing the Clearwater copper group, near Santa Rita. An ore chute has been completed and other preparations are made. D. C. Kling, Santa Rita, is superintendent, and John Asheroft, El Paso, Tex., president.

Hamilton.—Harold Finch, of Colorado, has taken a bond and lease on the A. A. Hamilton claims in Gold Gulch, near Santa Rita. A strike of gold ore in one of these properties has created considerable interest.

La Corona Gold and Copper Company.—J. E. Rhein, superintendent, has secured a bond and lease on the St. Josephine and Little Gem gold properties in Gold Gulch, near Santa Rita. On the St. Josephine the vein is 10 ft. wide on the surface. Development work is being pushed. The company is also developing 10 copper properties in the Santa Rita District. The offices of the company are in Kansas City, Mo., and at El Paso, Tex. The secretary is S. O. Jerome, Hotel Baltimore, Kansas City, Mo., and the superintendent, J. E. Rhein, Santa Rita, N. Mex. The board of directors comprises O. H. Baum, H. N. Lee, George O. Hilzinger, Dr. E. R. Carpenter, L. Blakesley, John Ashcroft, of El Paso, Tex.; J. E. Rhein, of Santa Rita, N. Mex., and J. K. Cubbinson, S. O. Jerome and J. A. Herrera, of Kansas City, Mo.

Michigan-New Mexico Copper Company.—After an inspection of the mines of this company, in the Lordsburg and Burro districts, the following directors, W. A. Dorlando, of Grand Rapids, Mich.; Albert Lahins, of Zeeland, Mich.; A. R. Gibson, of Santa Fe, N. Mex., and C. R. Luton, announced that it was certain that the company would build immediately a 50-ton concentrator at Lordsburg. Ground has been secured for the site.

Mineral Point Zinc Company.—The mines of this company are at Hanover. The officers are considering the construction of a plant at Hanover for the reduction of their low-grade zinc ores. The headquarters of the company are at Mineral Point, Wis.

Silver Cell.—A Silver City paper states that the reported sale of this mine in the Pinos Altos District to Harold Finch, of Colorado, by Dimmick Brothers, is confirmed. The consideration is given as $100,000. This mine netted Dimmick Brothers about $140,000, during the past 7 years, and is considered one of the best silver properties in the district.

OREGON.

BAKER COUNTY.

(From Our Special Correspondent.)

Bonanza.—The March run amounted, it is said, to $54,760. President Moore, of Pittsburg, has been at the mine, near Sumpter, to inspect the new hoisting plant. The shaft will be sunk to 2,000 ft.

Brooks.—A 300-ft. tunnel is completed on this property, joining the Ibex Mine. Work will be continued soon as supplies can be hauled in.

Oregon-Cracker Mining Company.—This company has started development work on its group of claims, at the junction of Cracker and Little Cracker Creek. Ore cars and trackage are being installed, and later in the season a 5-stamp mill and concentrators will be erected. Warren Cable, of Sumpter, is superintendent. There is a 10-ft. vein, carrying good values.

JOSEPHINE COUNTY.

Ida.—The Tremain mill is kept running night and day on ore that averages $15 to the ton. Messrs. Rae, Codding, Turnham and Swearinger, the owners, have 6 men at work. The mine is located on the middle fork of Louse Creek, above the Granite Hill Mine. The tunnel is in about 200 ft. The vein is 2 to 5 ft. wide and the richest rock from 6 to 8 in. wide, running about $80 in free gold and sulphurets.

Old Channel.—At these mines operations are carried on night and day. There is yet an abundance of water and the season promises to extend into July. Mr. Harvey, the superintendent, has sufficient water to keep 2 8-in. giants running, aside from a heavy flow used in working out the gravel of the deep canyon below the Rich Gulch diggings. The former owners of the mine dammed the tailings in the canyon till they accumulated 35 ft. deep. With the aid of a "self-shooter" the whole has now been cleaned to bedrock.

St. Helens & Galice Mining Company.—This company, with A. B. Cousins as secretary, has ground on Galice Creek above the Green Mine. It proposes to secure all the mines along the creek and combine them as one property, erecting a large double flume in the creek bed and working out the lower gravel in this way.

PENNSYLVANIA.

ANTHRACITE COAL.

A number of Scranton men have leased the old No. 5 culm bank near Plymouth, from the Delaware & Hudson Coal Company, and will transform the old breaker nearby into a washery. The bank contains thousands of tons of the smaller sizes of coal dumped there years ago. Coal will also be mined from the old workings and mixed with the product of the culm bank.

Lehigh Valley Coal Company.—This company's statement for March and for the 9 months from July 1 to March 31 is as follows:

	March.	9 months.
Earnings	$1,192,416	$16,323,845
Expenses	1,344,431	16,680,083
Deficit	$152,015	$356,238

For the 9 months there was an increase of $1,132,410 in gross earnings, an increase of $1,013,906 in expenses, and a decrease of $118,504 in the loss on operations.

In addition to other operations, this company is sinking a 300-ft. shaft on its Mineral Spring colliery plot at Parsons, Pa., to develop the red ash vein. The same company is also building a breaker at the same place and expects to have it completed by September 1. The machinery, engines, boilers, etc., are being built by the Vulcan Iron Works, of Wilkes-Barre and West Pittston. The capacity of the new breaker will be 1,000 tons of prepared coal in 10 hours. Several hundred men and boys will be employed.

Spencer.—This colliery in Dunmore, operated by A. D. and F. M. Spencer, has closed for an indefinite period for repairs. A new shaft is being sunk. Work will not be resumed until about September 1. Nearly 300 men and boys are affected.

BITUMINOUS COAL.

Carnegie Coal Company.—The Midway block of coal just south of the Panhandle Railroad at Carnegie, containing about 1,200 acres, has been purchased by this company for about $180,000. This is considered the finest block of coal ever sold on the Panhandle Railroad. The Carnegie Company will at once build a railroad 3-4 mile, connecting with the Panhandle at a point just west of Primrose Station. The plant will contain the best machinery. The tipple will be of steel, with a capacity of handling some 1,500 tons per day.

Morrellville Coal and Coke Company.—This company, with a capital of $15,000, has been organized at Johnstown. The officers are: President, Dr. J. C. Duncan; secretary, John Irwin; treasurer and manager, W. G. S. Robertson; directors—Messrs. Duncan, Irwin, and Robertson. The new property comprises 100 acres of land on what is known as the Strayer farm, above Morrellville. The Morrellville Company will do no work, leasing the property to Irwin & Robertson. The coal is the Miller seam and is about 3½ ft. thick.

SOUTH DAKOTA

LAWRENCE COUNTY.

(From Our Special Correspondent.)

Columbus Mining Company.—The work of clearing the old Ruth & Lardner shaft in Sawpit Gulch has started. It is to be sunk from the 200 to the 500-ft. level. It is estimated that 200,000 tons of ore are exposed.

Dakota Mining and Milling Company.—The cyanide plant in Deadwood is treating 100 tons of ore daily, using stamps. New ore bins have been added. The ore comes from the Gunnison, Peggy, and Jack Pot lodes near Portland, being mined in open pits.

Deadwood-Standard and Spearfish Companies.—A. C. Burrage, of Boston, Mass., who has a bond on the properties, has been visiting the Black Hills. According to his bond he is to pay $1,800,000 for the properties. From 100 to 300 miners have been prospecting on the ground for the past few weeks. Two cyanide plants are in continuous operation on the property.

Golden Reward Mining Company.—Harris Franklin, one of the original promoters and a heavy stockholder, has resigned as general manager. His successor has not been named.

Hidden Fortune Mining Company.—The Baltic tunnel from Deadwood Gulch is in 1,680 ft., advancing 9 ft. a day. It is 10 ft. wide and 7 ft. high, with 2 tracks. Thomas J. Steele has located in Lead to superintend operations.

Highland Mill.—A broken crank pin resulted in great damage to the 350-h. p. engine, and the mill is shut down while the engine is being repaired. There are 140 stamps in this mill of the Homestake Company, and while they are idle the mining force has been decreased.

Penobscot Mining Company.—The purchase of the Realization group of Ernest May and George Johnson; the Penobscot group of R. M. Maloney; the Smoky City lode and Smoky City fraction of Sol. Burns and John Little and a fraction of John Noland, has been completed and payments have been made. The prices aggregate $155,000. T. R. Byrns is moving from Chicago to assume general management, and Edward Manion has been elected superintendent. Work has started in the Realization shaft at Garden City, 6 miles from Deadwood, a hoist and boilers having been purchased at the Snowstorm shaft in Nevada Gulch. A new air compressor and drills have been ordered.

PENNINGTON COUNTY.

(*From Our Special Correspondent.*)

Aberdeen Mining Company.—John Daly, superintendent, has returned to Hill City, prepared to resume work on the property, which joins the J. R. Mine.

Cumberland Mining Company.—This company was organized last year at Cumberland, Ky., to purchase the J. R. Mine. A contract has been let to sink the shaft 200 ft. deeper. H. C. Crocker, of Hill City, is in charge.

Empire State Mining Company.—A 5-stamp mill erected at the Golden Slipper Mine is nearly ready to run. The company has been developing the Golden Slipper as far as the 300 ft. level.

Lulu Mining Company.—M. L. Day, the superintendent, is expected at Hill City from the east with new hoisting machinery. A shaft is to be started at the intersection of 2 veins.

Mount Aetna Mining Company.—A new shaft has been started on the apex of the lode to reach a tunnel 80 ft. below. John G. Mattes, of Keystone, is president and general manager.

Sunbeam Mining Company.—Rich free milling ore is reported in the J. N. Wright property on Friday Gulch near Hill City. It was first reached at 120 ft., and the shaft is down 15 ft. in it. The vein is 3½ ft. wide, and assays are said to show $100 to the ton.

TEXAS.

GRIMES COUNTY.

(*From Our Special Correspondent.*)

Chalk Deposits.—Quite a large quantity of chalk, beds of which are numerous in this county, has been shipped this month. As soon as the International & Great Northern Railway is built north from Navasota the deposits will be extensively developed.

HARDIN COUNTY.

(*From Our Special Correspondent.*)

Sour Lake Springs Oil Wells.—The developments at Sour Lake Springs, following the coming in of the gusher of the Atlantic & Pacific Company, have not been as extensive as might have been expected. The high prices of land nearby and the ability to obtain a guaranteed gusher on Spindletop for from $7,000 to $10,000 has a tendency to restrict operations. The location is 9 miles from a railway, and until the projected pipe lines are constructed no shipments will be made. At present there is no tankage, and the oil is used for drilling purposes only. The gusher has not been subjected to a long test, and its capacity is undetermined; but 3,000 to 5,000 bbls. is probably near the mark. The oil is of slightly better quality than Beaumont oil, but 10 to 15 per cent of sand is ejected with the petroleum.

Atlantic & Pacific.—The No. 2 well is down 550 ft., and if it proves another gusher operations will be greatly extended, though the field appears, like Spindletop, to be limited in area.

Sour Lake Springs Company.—The Bird Syndicate and the J. M. Guffy Petroleum Company are the only other wells being drilled.

JEFFERSON COUNTY.

C. K. McFadden, American manager of the Bird Syndicate, Limited, of London, England, has stated that a deal had just been consummated for the transfer of all the Texas oil land holdings of the Bird Syndicate to the Beaumont Petroleum and Liquid Fuel Company. The latter is an English corporation, with a capital stock of $1,250,000. Its principal stockholders are Charles James Palmer, and one of the leaders of the Russian oil group of financiers in London, Henry S. Coates; Alfred S. Williams, Sir Robert Monticreif, and Rear Admiral Brand.

(*From Our Special Correspondent.*)

Phosphate beds have been located in the southern part of the county. The deposits are said to be extensive and close to good shipping points.

Beaumont Oil Field.—The pressure is declining very perceptibly on Spindletop, and the big companies admit it, although the small ones with 75,000 and 100,000 bbl. (?) per day wells, deny it vociferously. Gas and compressed air are being used to increase the flow. There are few wells on the hill to-day that will force 3,000 to 5,000 bbl. per day into a tank ¼ of a mile away. Oil can be bought f. o. b. Gladys at 8 to 10c. per bbl., and little or no profit can be made on sales; in fact, a number of the big companies are not operating their tank cars, and decline all rail shipments until crude oil is worth 20c. Some of the small companies who have cars talk of a combination to raise prices, but nothing has been accomplished so far, though prices at the well or tank have stiffened to 3 and 4c., respectively, instead of 2 and 3c. Meantime water shipments are increasing rapidly, and every week sees new arrivals at Port Arthur and Sabine, and contracts are let for the construction of a lot of tankage at Sabine. The Burt Refinery Company has started a new pipe line from the hill to Sabine, and it is stated that the Higgins Oil and Fuel Company will also put another one there. Sabine is 10 miles nearer the Gulf, and vessels loading there get their cargo with less delay. The Sun Company, the Standard and the Lone Star Crescent are shipping from Sabine all cargoes for Gulf, Mississippi or east coast points. The Guffey Company loads the only desulphurized oil, which goes to England. I am certain that no water shipments are made at less than 20c. bbl. for crude, and think the average is from 25 to 30c. The town is nearly ripe for many changes and combinations, which must come before the producers can make any money under the load of expense and wastefulness now rampant. Oil cannot be sold at a profit at current prices; the ruinously low prices will serve to introduce the fuel to new consumers, but stockholders will be asking for interest, and the companies who are ready to show a credit from oil sales can be counted on the fingers of one hand.

Figures for April shipments are not yet available, but they will be slightly in excess of March. Rail shipments have decreased a little, while water shipments have increased. Cars are not scarce, but prices f. o. b. Gladys, crude at 8c. and 10c. bbl., are not satisfactory to strong companies. Prices at Port Arthur and Sabine for water shipment average between 25 and 30c. per bbl. Efforts to induce all producers to refuse offers less than 20c. f. o. b. Gladys meets with little success, although it is admitted that no money can be made at present prices. Some few of the wells will send 5,000 bbl. per day into tanks by natural pressure, but nearly all require to be agitated to start them flowing.

UTAH.

(*From Our Special Correspondent.*)

Ore and Bullion Settlements.—The settlements for the week ending May 3, reported by the banks, are as follows: Silver-lead ores, $142,900; bullion, $53,500; gold bars, $5,000.

Treatment of Low Grade Ore.—For some time Col. H. G. Heffron, of the Bingham Consolidated Smelter, has been endeavoring to increase the tonnage of low-grade ores. His system is to have the mines ship certain quantities to the smelter at prices that will yield a profit. At present ore running $15 per ton and over is profitable. He believes that reduced prices for treatment and railroad rates will enable the mines to ship ore that runs as low as $9 or $10 per ton.

BEAVER COUNTY.

(*From Our Special Correspondent.*)

Cactus.—Robert J. Coleman and J. M. Callow have returned to Salt Lake City after having installed the new experimental mill. It is treating 10 tons of ore daily, and the intention is to experiment with the different kinds of ore the group produces. The concentrates turned out are of exceptional cleanness. Hard work and repeated trials on the part of J. M. Callow, as engineer in charge, are responsible for the success of the mill.

Newhouse-Lewis.—Deed to the Massachusetts group, which lies in Loeber Gulch, northwest of Frisco, and consists of 6 claims, has passed from Samuel Newhouse to A. B. Lewis. The transaction is the outcome of a division of interests, in which Mr. Newhouse takes the Cactus group of 6 claims, in the same locality, and Mr. Lewis takes the Massachusetts.

JUAB COUNTY.

(*From Our Special Correspondent.*)

Tintic Shipments.—The shipments reported for the week ending May 3 are divided as follows: Carisa, 11 cars ore; Ajax, 2 cars ore; Boston & Tintic, 1 car ore; South Swansea, 6 cars ore; Grand Central, 5 cars ore; May Day, 2 cars concentrates; Yankee Consolidated, 6 cars ore; Mammoth, 3 cars ore; Lower Mammoth, 4 cars ore; Bullion-Beck, 5 cars ore.

Carisa.—The ore from the latest strikes have reached the market, and control assays show, as reported, nearly 80 oz. silver, $15 in gold, 7 per cent lead and 2.4 per cent copper. The size of the body from which this comes is not reported.

Centennial-Eureka.—Manager Allen reports that exploration is soon to begin on the ground above the shaft mouth, which will give over 600 ft. of stoping ground. Confidence in this territory is due to showings made in the upraises.

May Day.—The dry concentration plant has closed down, for possibly 30 days. The management says it will be silent until the machinery that is on the way arrives and the changes in equipment are completed. Considerable interest is centered in this plant, and the changes will be watched carefully.

SALT LAKE COUNTY.

(*From Our Special Correspondent.*)

Bingham Shipments.—For the week ending May 3 the following consignments are reported: Neptune, 3 cars ore; Winnemucka, 2 cars ore; New England, 3 cars ore; Columbia, 1 car ore.

Bingham Consolidated.—The blowing in of one of the converters this week was witnessed by E. S. White, J. A. Coram, W. F. Hammett, C. D. Coram, and D. McVichie, general manager of the company, and W. H. Nutting, superintendent of the plant. At present the plant is handling about 400 tons of ore daily, and a large amount of matte is in the yards waiting the completion of the converters.

Boston Consolidated.—A new compressor is soon to be installed; grading is under way for that purpose. It will be of 12 to 14 drill capacity, and will be situated on the ground formerly occupied by the old Stewart Mill, from which place work will start on the 1,200-ft. tunnel. The company is now employing about 50 men.

Maxfield.—A shipment is reported of 1 car of ore from the mine.

SUMMIT COUNTY.

(*From Our Special Correspondent.*)

Park City Shipments.—For the week ending May 3 the MacIntosh Sampler reports the receipt of the following consignments of ore: Daly-West, 2,064,550 lbs; Ontario, 1,453,550 lbs.; Anchor, 420,000 lbs. The output of the Silver King for the same time is approximately 1,645,880 lbs. of ore.

Daly West.—An important strike is reported in the Quincy ground, lately acquired by this company. According to the report from Superintendent Kirby the find was made at a point 250 ft. west and south of the main Quincy stopes and in line with the strike of the vein. The up-raise in the shoot of ore is showing a body said to resemble those from which so many thousands of dollars have been taken.

Daly-Judge.—A payment of $200,000 has been made to the First National Bank of Park City on the purchase price of the Anchor property, as trustee for the traders. This payment leaves a balance of $500,000, and, although the final payment does not mature for 18 months, the management says there is no doubt but that it will be disposed of in much shorter time. The stock outstanding of the Anchor Company that has not been turned over to the buyers is being taken in at $4.40 a share, less the indebtedness of $1.15, or $3.25 a share net.

Zinc Plant.—A second payment by the Boston men, who recently purchased the zinc plant at Park City, is reported, and assurances are given that the remainder will follow.

TOOELE COUNTY.

(*From Our Special Correspondent.*)

Stockton Shipments.—For the week ending May 3 consignments of 32 cars are reported, divided as follows: Ophir Hill, 30 cars of concentrates, and Cygnet, 2 cars of ore.

Fish Springs Shipments.—The Utah shipped 2 cars of ore during the week ending May 3.

Sunshine.—The new mill is in commission, and is handling 100 tons of ore a day. This amount is to be increased as the filter presses designed by Manager Moore are ready. The ores that are now handled give an average of $4 per ton; a saving of 90 per cent is reported made, which makes the return to the company $3.60 a ton. The success that Mr. Moore has had in placing this property on what promises to be a paying basis, by the system of filtration, has given rise to schemes to revive some other of the low-grade properties in Mercur and at West Dip as well. F. C. Dayton, of Bridgeport, Conn., who is serving the Sunshine Company as secretary, has a plan under development, and has gone East to perfect his scheme.

WASHINGTON.

FERRY COUNTY—REPUBLIC.

(*From Our Special Correspondent.*)

Butte & Boston.—A new deposit of ore is reported that assays from $42 to $53 per ton.

California.—The contract for building a wagon road from the mine to the Washington & Great Northern railway has been let, and work is under way.

Hawkeye.—A diamond drill has been installed, for prospecting on the lower level.

Maud S.—Work was resumed April 28 in the west cross-cut.

Mountain Lion No. 2.—On the 230-ft. the cross-cut is in 115 ft., 10 ft. being in ore. Water is coming in faster than it can be drawn out by windlass and bucket, and a pump and hoist will be put in.

Red, White and Blue.—The tunnel is in about 200 ft., the last 30 ft. being in the vein. The ore is quartz, carrying chalcopyrite.

Silver Dollar.—The new 2-compartment shaft is down 20 ft. Each compartment is 4 by 4 ft., 8 in. in the clear.

Standard.—A disagreement among the stockholders has delayed work, which will be resumed about May 20.

Tom Thumb.—The east cross-cut is in 55 ft. from the station at the 400 ft. and going ahead 6 ft. a day. On the 265-ft. level, 100 ft. west from the main

shaft, a drift is going south on the vein. A well-equipped assay office forms part of the surface improvements.

WEST VIRGINIA.

J. M. Guffey, of Pittsburg, Pa., has bought a coal tract of 11,000 acres in Preston and Barbour counties. The purchase aggregated $132,000.

United States Coal and Coke Company.—Mines and oven plants have been located in the Pocahontas District on the Tug River. Locations have been made for 8 mines and for from 1,000 to 1,200 coke ovens. A contract has been awarded to Louis Carr, of Welch, for putting in a saw mill and for felling the forest near the mines. The Norfolk & Western is building a 10-mile branch of railroad from Welch, but this is not expected to be completed until September. Heavy material cannot be hauled into the locations before that. It is expected that coke can be made by Christmas, the initial output to be 3,000 tons a day. The United States Coal and Coke Company, as a subsidiary company of the United States Steel Corporation, will mine the coal and make the coke, and the H. C. Frick Company will distribute it. The opening of the mines will give the Ohio and Chicago plants of the combine a plentiful supply of coke without the long rail haul now necessary.

WISCONSIN.

IRON—MENOMINEE RANGE.

Florence.—At this mine, at Florence, Wis., the men went out because of the refusal of the management to reinstate 6 discharged miners. Ladenberg, Thalman & Company, of New York City, the owners, will remodel the surface plant and 2 80-h. p. boilers will be added. Improvements to the shaft will be made also.

FOREIGN MINING NEWS.

AUSTRALIA.

TASMANIA.

Mount Lyell Mining Company.—This company reports for the four weeks ending April 2 a total of 22,214 tons of ore smelted, the yield being 766 tons black copper, containing 758 tons fine copper, 57,157 oz. silver and 1,783 oz. gold. The average return was 3.41 per cent copper, 2.57 oz. silver and 0.08 oz. gold to the ton.

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

Boston-Montreal Smelter.—This plant, at Boundary Falls, is running, with about 75 men employed. H. C. Bellinger is consulting metallurgist for the company. The new smelter, which was abandoned a year or so ago while in course of construction, was owned by the Standard Pyritic Company, and was abandoned because of lack of ore. Canadian and Boston parties have since taken hold of it. The plant is of 400-ton capacity.

BRITISH COLUMBIA—VANCOUVER ISLAND.

Crofton Smelter.—It is stated that this plant will be ready about July 1. There are now about 250 men at work. It will smelt the ore from the Leonora Mine. It is reported that the Tyee Mining Company, at Ladysmith, will put in a 100-ton smelter in the near future.

ONTARIO—ALGOMA DISTRICT.

Algoma Commercial Company. —This company, of Sault Ste. Marie, Ont., of which E. F. Bradt is general superintendent of mines, is to let contracts for sinking a shaft and driving a drift at the Josephine Mine, Michipicoten District. The proposed shaft is to be 6 ft. by 8 ft. within timbers, and it is to be sunk at an angle of from 45 to 60 degrees, to 350 ft. The rock in which the shaft is to be sunk is greenstone.

NEW ZEALAND.

Exports of gold and silver from the Colony for February and the two months ending February 28 are reported by the Mines Department as below, in ounces:

	—Gold.—		—Silver.—	
	1901.	1902.	1901.	1902.
February	53,404	41,632	48,819	48,842
Two months	75,297	74,492	81,895	85,217

For the two months this shows a decrease of 805 ozs., or 1.1 per cent in gold; and an increase of 3,322 ozs., or 4.1 per cent in silver. The crude gold exported this year was equal to 67,948 ozs. fine gold, or $1,404,490.

SOUTH AMERICA.

BRITISH GUIANA.

Exports of diamonds for the 3 months were 3,427 carats, valued at $41,062, against 326 carats, valued at $4,656 last year.

A new mineral in the returns is kaolin of very fine quality, of which 900 tons have been exported this year.

MINING STOCKS.

(Complete quotations will be found on pages 683 and 684 of stocks dealt in at):

New York.	Mexico.	San Francisco.
Boston.	London.	Salt Lake City.
Philadelphia.	Paris.	Spokane.
Colo. Springs.	Toronto.	St. Louis.

New York May 8.

With few exceptions prices of the copper shares moved about as last week, while sales are mostly among professional traders.

Amalgamated sold at $65⅛@$67, though with the announcement of the meeting on June 2, and subsequent increased transactions in the stock, the price weakened. Anaconda, however, gained, selling at 110½@114 per cent, or $27.62½@$28.50. On curb, some trading is noted in United Copper shares, when issued, at $34¾@$36. Greene Consolidated, of Mexico, has its supporters, and sells at $30½@$31¼. Tennessee brought $12, British Columbia, $8⅞@$9⅛; Montreal & Boston, $3¼@$3; White Knob, of Idaho, $23½@$25⅛; Union, of North Carolina, $3¾@$4, and Gold Hill, $2@$2¼.

Cripple Creek gold stocks are uninteresting, as investors are awaiting more cheerful news from the district. Portland sold at $1.80, Elkton at 68@67c., and Isabella at 24c. The activity in mining in other parts of Colorado has brought out inquiries for the established Leadville stocks, and some sales are noted.

In the California section Quicksilver common shares reappeared at $3½. Brunswick gold is unsteady at 15@12c.

Ontario silver, of Utah, though it sold this week at $8, is not pressed on the market, even with silver at its present low price.

Some of the Comstock shares have changed hands at little fluctuation in prices.

Standard oil is offish, selling at $638@$630. The quarterly dividend, to be paid in June, has been cut to 10 per cent, which compares with 20 in March and 12 in June, a year ago. In the whole of 1901 the dividends aggregated 48 per cent. Since the New Jersey corporation was formed in June 1899 the dividends have totaled $49,485,000 on an issued capital stock of $97,000,000.

Application has been made to the New York Stock Exchange to list $9,416,000 6 per cent cumulative preferred stock and $7,410,300 common stock of the General Chemical Company. Heretofore the stock has been traded in on curb.

Boston. May 7.

(From Our Special Correspondent.)

Copper shares were pretty weak late last week and early this, but they easily recovered the declines, and a rather stable market is on at present. Very few stocks are offering and brokers report accounts in good state. It is the consensus of opinion on the street that the metal is in a better position than for some time regarding price, although an increased production must be faced in the not far distant future. Calumet & Hecla has made a large sale of copper, but the price cannot be ascertained at the company's office. Street report puts it at 12½c., yet in the trade 12⅛c. is said to be the figure. There is a better feeling on Amalgamated, and it is reported here that the stock is being accumulated by inside interests. This is borne out to an extent by its continued strength.

This has been a week for assessments. Three of the so-called prospects, or cheaper class, have levied. The Victoria has called for $3, Michigan $2 and Winona $1 per share. The first two are very promising. In fact, the call for money is to build stamp mills. Both have been opened up to an extent which warrants active mining. Winona cannot be called anything but a prospect. Victoria sells for $4.75, Michigan for $10.50 and Winona for $2. Atlantic, which dropped to $28, with nothing between, suddenly spurted to $34 on the report of the striking of copper bearing amydaloid lode on section 16. The management still holds strong hopes of finding the Baltic lode. Arcadian sold down from $7 to $4.25, but has rallied to $6 again. The talent is very willing to gamble in this stock and takes a whirl every time it breaks. Trinity also yielded 87½c. to $12.12½, but recovered to $13.25.

United States Oil displayed considerable activity and spurted $3.25 to $18, with subsequent reaction to $16.75. The buying is in connection with a deal for a coal property, which will be worked in conjunction with the oil lands. Although the deal has not been announced, it is said that the United States Oil Company will issue additional stock to take up the coal lands. Copper Range Consolidated took a $5 dip to $53.50 late last week, but on Tuesday of the current week it made a $4 advance touching $60. Wednesday it touched $60.50 and closed $59.50. Manipulation was responsible for a large part of the advance, but the stock has proved to be a good trading one, which makes it popular. Old Dominion has advanced $1.50 to $20, but trading in it is light. Isle Royale records a 75c. advance to $14.75; Mass Mining, $2 to $19, and Mohawk, $3.50 to $37.50. Calumet & Hecla is up $12 to $545.

Advices have been received from the Bingham Consolidated mine that the converter was started Tuesday. The third furnace has also been blown in. There has been considerable buying of Bingham from Salt Lake and the stock has risen $4.25 to $38.50. When this company begins to use the ore from the Dalton & Lark properties, lately acquired, a large production is expected at a very slight cost, as these contain both sulphide and siliceous ores. The company is earning nearly $4 per share now on its 150,000 shares of outstanding stock.

Colorado Springs. May 1.

(From Our Special Correspondent.)

The market held its own this week, with fractional gains and losses. There were no changes of sufficient magnitude to alter the level of prices for the past seven days.

Daniel MacLaren, the Scotch expert, has completed his examination on Stratton's Independence Mine for certain large London stockholders, and has left for Australia. Many rumors are current as to his report.

Portland has held above $1.80, and up to $1.85 on fairly active dealing. The shares closed to-day with $1.80⅛ bid and $1.83 asked, selling at $1.82 and $1.81.

It is reported on the authority of the United States Reduction and Refining Company that the Portland will be enjoined from operating its mill on the ground that it is using certain patents that are the sole property of the United States Company. The case will be started in the United States courts in a few days, and the Portland attorneys are already preparing an answer. The Portland Company will give a large bond and ask the court's permission to operate the mill during the pendency of the suit.

During the past week a large selling order of Elkton appeared on the local market that caused a break in these shares from 71 to 62⅞c. The stock recovered somewhat to-day, selling at 63@64c. El Paso weakened in sympathy with Elkton, selling down to 42½, recovering to-day to 44 but losing to 43c. Last Dollar, the control of which is owned in New York, was quoted as low as 45c., owing to a report that the quarterly dividend would not be paid until the latter part of this month. The stock recovered, however, being quoted at 55c. to-day. Isabella weakened, the closing quotation to-day being 23@23¼c. Vindicator held steady during the week at 95, holding up well under heavy selling.

Among the prospects C. K. & N. continues to be a leader on account of the good showing being made at the mine on Beacon Hill. The stock gained perceptibly during the week, recording an advance of three-quarters of a cent, closing strong.

DIVIDENDS.

Name of Company.	Latest Dividend—Date.	Per Share.	Total.	Total to Date
Anaconda Copper, Mont.	May 15	$0.50	$600,000	21,450,000
†Amalgamated Copper	May 26	.50	769,439	18,117,809
*Bald Butte, Mont.	May 10	.06	15,000	1,192,148
*Bunker Hill & Sull.	May 5	.07	21,000	1,390,000
Calumet & Hecla	May 22	5.00	500,000	78,850,000
*Central Lead, Mo.	May 15	.50	5,000	290,000
*Cherry Hill, Cal.	May 15	.00¼	2,500	47,500
*Empire State, Idaho	May 15	.05	25,277	1,384,723
Lehigh C. & Nav.	May 27	1.50	430,399	19,808,187
Le Roi No. 2, B. C.	May 5	1.20	144,000	288,000
†Ontario, Utah	Jun. 20	.30	45,000	14,827,000
*Rocco Homestake, Nev.	May 10	.01½	4,500	76,500
*Silver King, Utah	May 10	.66⅔	100,000	5,250,000
†Standard Con., Cal.	May 22	.10	17,839	4,071,136
†Standard Oil	June 16	10.00	9,700,000	49,485,000
*Sta. Maria Guadalupe	May 10	4.30	10,750	336,125

*Monthly. †Quarterly.

ASSESSMENTS.

Name of Company.	Location.	No.	Delinq.	Sale.	Amt.
Ben Franklin	Cal.	..	May 19	.....	.01
Challar	Nev.	58	Apr. 23	May 14	.05
Coe	Cal.	..	May 19	.....	.25
Comstock	Utah.	4	May 3	May 23	.10
Con. Imperial	Nev.	..	Apr. 27	May 27	.01
Golden Star	Cal.	..	May 31	.....	.04
Gold Hill	Cal.	49	Apr. 23	May 14	.05
Gould & Curry	Nev.	98	May 1	May 20	.10
Joe Bowers	Utah.	..	May 12	.....	.01
Jumbo	Utah.	..	May 16	June 4	.00 1-6
La Suerte	Cal.	..	May 13	.....	.02½
Little Standard Oil	Cal.	3	Apr. 12	May 12	.10
Marina Marsicano	Cal.	28	Apr. 19	May 12	.03
Martha Washington	Utah.	9	Apr. 22	May 10	.01
Occidental	Nev.	38	May 15	June 5	.05
R. G. W.	Utah.	..	May 6	May 26	.00½
Silver King	Ariz.	24	May 27	June 24	1.00
Tomboy	Utah	..	Apr. 19	May 19	.00¼
Va. Con.	Cal.	12	May 5	May 26	.02
West Morning Glory	Utah.	11	May 15	May 20	.01
Yellow Jacket	Nev.	11	May 10	June 19	.10

Salt Lake City. May 3.

(*From Our Special Correspondent.*)

Trading the last two weeks has been at lower prices than have been ruling during the month. For the week ending May 3 the most active traders on the board have been Ajax, Carisa, May Day, Star Consolidated, South Swansea, Uncle Sam, California and Century. Ajax brought out 31,700 shares, at from 46½ to 41½c. Anchor shares have advanced to $3.40, with the sale of 700 shares. Carisa remains about the same figure, selling its 79,300 shares at 41@35c. Consolidated Mercur stands steady at $1.79 @$1.88, selling this week but 2,000 shares. Daly-West marketed 1,124 shares, at prices ranging from $45.65 @$43.50. Ontario has dropped from $9, of last week, to $8.50 at the close of this week. Owing to the condition of the property the Star Consolidated has advanced from 16 to 24½c. this last week, which price brought out 45,300 shares. California has receded to 9c. and climbed no higher than 18¼, which is a drop not equaled by any on the board. During the last days the shorts have been getting in their work, and have hammered some of the smaller stocks.

San Francisco. May 3.

(*From Our Special Correspondent.*)

The stock market has been fairly active, with occasional spells of weakness. Prices have improved considerably upon the whole. Ophir was still the chief attraction, and sold up to $1.95@$2. Other quotations noted are: Consolidated California & Virginia, $1.65@$1.70; Mexican, 64@66c.; Potosi, 32c.; Sierra Nevada, 31c.; Best & Belcher, 28@29c.; Gould & Curry, 18@19c.; Savage, 15c.

Sales of oil stocks have been somewhat lighter, but prices have been well maintained. Some quotations noted are: San Joaquin Oil and Development, $1; Home, $3.65; Sterling, $1.60@$1.70; Four Oil, 54c.; Sovereign, 33c.; Occidental, 19@20c.; Apollo, 20c.; Petroleum Center, 13@14c.

Sterling was the special favorite, selling in large blocks. There was considerable buying of San Joaquin Oil and Development, which has been quiet for some time past.

Paris. April 27.

(*From Our Special Correspondent.*)

Our Burse continues to be quiet, so far as mining stocks are concerned. The South African market is very quiet, all parties waiting for new developments in the peace negotiations. If the end of the war should really appear, there is general anticipation of a boom in these stocks. It is quite probable, however, that there will be some disappointment in this respect.

Copper stocks continue uncertain and rather depressed, though there has been no change in conditions. The Boleo dividend for the past year has been fixed at 60 fr. a share.

The lead and zinc shares have been inclined to weakness, although there has been some improvement in the prices of the metals. Some reductions in dividends are expected, especially as the payment on Vieille Montagne has been reduced from 30 fr. to 20 fr.

Le Nickel has fallen somewhat, though it would appear that the position of the company would be improved by the formation of the new Nickel Trust. It is understood here that at least friendly relations exist between the Societe le Nickel and the Trust, and that prices of the metal will be maintained.

The movement of gold and silver in France for the three months ending March 31 is reported by the Ministry of Commerce as below:

Gold:	1901.	1902.	Changes.
Imports	Fr. 113,226,000	Fr. 145,766,000	I. Fr. 32,540,000
Exports	9,915,000	15,341,000	I. 5,426,000
Excess	I. 103,311,000	I. 130,425,000	I. 27,114,000
Silver:			
Imports	23,777,000	24,764,000	I. 987,000
Exports	32,636,000	17,920,000	D. 14,716,000
Excess	E. 8,859,000	I. 8,844,000	

Imports of copper and nickel coins, rated at their face or coinage value, were 28,000 fr., against 23,000 fr. in 1901. Exports were 916,000 fr., against 64,000 fr. last year.

The foreign merchandise trade of France for the three months ending March 31 is reported by the Ministry of Commerce as below:

	1901.	1902.
Imports	Fr. 1,217,766,000	Fr. 1,290,900,000
Exports	942,421,000	1,046,747,000
Excess, imports	275,345,000	244,153,000

This shows an increase of 73,134,000 fr. in imports; an increase of 104,326,000 fr. in exports; and a resulting decrease of 31,192,000 fr. in the balance of imports.

There is some talk to the effect that a number of American stocks may be listed on our Bourse shortly. I do not think it is probable that this will be done. The numerous formalities required and the Bourse tax on foreign stocks may discourage the projectors of the plan. Our market is not yet ready for American securities. A good deal of teaching is needed first.

An interesting discussion on the capitalization of mining and industrial companies has been started by M. Paul Leroy-Beaulieu in l'*Economiste Francais*. Unfortunately such capitalizations are generally determined by opportunity rather than by reason.

AZOTE.

London. April 26.

(*From Our Special Correspondent.*)

The West Australian market has been resuscitated somewhat by the issue of the reports of Ivanhoe and Golden Horseshoe. The result of the latter's working in 1901 is about the same as in the previous year, but the Ivanhoe has not been able to maintain its dividend at so high a level. Both companies seem to be on a fairly good working basis, but there is not much being done in their shares at present owing to the public having become tired of the West Australian market and its many devious passages. The reports issued by these companies are full and interesting. Two other West Australians that can hold up their heads with a certain amount of justifiable pride are Great Boulder, Perseverance and Great Fingalls. The prices of the shares on each of these are very high, but there does not seem to be a very active market in them. Lake View Consols continue low, as the new management has not yet straightened things out and the immediate prospects are not encouraging from a speculator's point of view owing to the large accumulations of low grade ore. The results of the new management's explorations and developments are looked forward to anxiously.

The Indian mines have been slightly affected this week by the intimation that Champion Reef is short of water and that this mine and others may have to suspend milling operations. The effect on the market has not been very great, as the shares are mostly firmly held.

COAL TRADE REVIEW.

New York. May 9.

ANTHRACITE.

The demand for coal continues strong from nearly all consuming territories and barring interruptions of production, the tonnage mined in May bids fair to break all records for that month. The scarcity of vessels for coastwise shipments, that has existed several weeks, continues and is now, if anything, more marked than it has been. Car supply at the mines shows some improvement; except for a possible strike of the miners the outlook is as fair as any man in the trade can desire.

Reports of all sorts about the labor situation have been in circulation this week and newspapers that ought to know better have been printing the wildest kind of stuff. Whether or not certain prominent politicians have been pulling wires, the whole matter has now reached a point where political effect seems the object most desired, while the actual facts regarding the earnings of the miners are carefully withheld. Any one familiar with the history of the anthracite trade who will take a trip through the mining regions can soon satisfy himself that the miners are better off to-day than in the past 30 years: in fact, the total earnings of the men are probably greater than ever before. The agitation for an 8-hour workday and higher wages has not been started by the men who mine the coal. It rests on motives having but an indirect connection.

Trade at the head of Lake Superior is quiet. Supplies on the docks are about cleaned up and comparatively little anthracite has arrived yet. In Chicago territory business is active. The total amount of coal bought during April was far ahead of last year's figures. Receipts of all-rail coal are fairly liberal. Along the lower lakes and in Canadian territory there is a good demand for coal, but receipts are light. In the all-rail trade to the eastward business is brisk, particularly in Pennsylvania and New Jersey. Along the seaboard demand continues strong. Coastwise shipments are restricted by the lack of vessels. Egg, stove and nut sizes are in most demand, though the steam sizes are still selling very freely at good prices. The May prices for free-burning white ash coal f. o. b. New York Harbor shipping ports are: Broken, $3.85; egg, stove and nut, $4.10.

BITUMINOUS.

There is a heavy demand all along the Atlantic seaboard for bituminous coal and a considerable tonnage is in transit from the mines. Car supply has improved again, permitting increased shipments. The shortage of vessels for coastwise business, however, continues, and is now the chief restriction on shipments to points beyond Cape Cod. Some improvement in vessel supply has developed within a few days, as a considerable number of craft that were intending to take anthracite, fearing some delay in getting cargoes, have broken away and are loading bituminous where quick despatch has been promised.

Trade in the far East shows a considerable demand for coal, but a fair tonnage has gone forward and producers are gradually wiping out old orders and catching up with demand. Along Long Island Sound the demand is still heavy and producers are unable to keep up with it, particularly producers of the higher grades of coal. Consumers at New York Harbor points are getting fair tonnages and the trade in that territory is in an easy condition. All rail demand continues active and the needs of consumers exceed the tonnages forwarded by producers.

Transportation from the mines to the tidewater shipping ports is a little slower than it has been, and coal is a week in coming through when it should come through in 3 to 5 days. Car supply has improved and is now fair, ranging up from 75 per cent of the demand. In the coastwise vessel market, vessels continue scarce and in demand. We quote current rates from Philadelphia as follows: Providence, New Bedford and Long Island Sound, 75c.; Boston, Salem and Portland, 95c.; Wareham, Portsmouth and Bath, $1; Lynn and Gardiner, $1.05; Bangor, Newburyport and Saco, $1.10, with towages to last port. Rates from the farther lower ports are 10c. above these figures.

Birmingham. May 5.

(*From Our Special Correspondent.*)

It is stated that the consumption of oil as fuel in the South is beginning to be felt. Two or three sessions of the Alabama Coal Operators' Association, held in this city recently, were attended by a large number of the operators, and the future of the coal industry was discussed. The operators are paying a higher price now for mining than ever before. Those who do not use their coal in the manufacture of pig iron are suffering from these high prices. The new contract with the miners will be made during the month of June, and efforts are to be made to get a separation of domestic and iron furnace coal.

The Sloss-Sheffield Steel and Iron Company expects to have the Flat Top Mountain mines in operation within the next two months, and will then abandon the Coalburg mines, which are rapidly playing out.

Chicago. May 6.

(*From Our Special Correspondent.*)

Anthracite continues to be fairly active; there is little change, if any, due to the advance in the wholesale price of 10c. per ton over the April rate, making the quotation for May $5.60. Much uncertainty exists as to the prices for the summer; the customary advance of 10c. per ton each month has not yet been agreed upon. In great part this is due to the uncertainty attaching to water transportation facilities; the conditions of the South Branch and the tugmen's strike have combined to make coal dealers who get supplies by boat uneasy.

The only notable feature in the bituminous coal market in the last week has been a reduction of railroad rates on smokeless coals of 25c. per ton, causing a corresponding reduction in wholesale prices. Smokeless lump and egg are now quoted at $3.25; smokeless nut at $3, and smokeless mine-run, $2.85. These coals are increasing in demand slowly through the anti-smoke crusade being waged in Chicago by civic authorities and associations of citizens. Other grades of bituminous are as last week: Hocking, $3; West Virginia, $3.47; Youghiogheny, $3.55; Indiana block, $2.45; Indiana semi-block, $2.10; Clinton lump, $1.90; Indiana lump, $1.80; Northern Illinois run-of-mine, $1.80; Southern Illinois run-of-mine, $2; blacksmith's coal, $3.40.

Cleveland. May 6.

(*From Our Special Correspondent.*)

In coal shipments there are still many difficulties, especially as to the movement by lake to the northwest. The movement from the mines to the lakes has been anything but satisfactory. Last week, for the first time, the supply was nearly up to the requirements. Now, however, the movement has relapsed and shippers are sending contract boats to the head of the lakes without loads because they cannot get the cars with which to move the coal to the lakes, although the material is mined in sufficient quantities to meet every possible demand. The sales in the Northwest are still being made on a very large scale and the prospects are for a very heavy movement during the year. The railroads, however, are rich in promises but poor in performance. Some boats have waited from three to six days at one of the docks along the south shore of Lake Erie to get a cargo. Delays of this sort have been frequent and have become a feature of the market. The scant supply of coal has precluded the possibility of any discussion of rates, as wild charters have been decidedly rare and may be for a considerable time ahead. The rates under these circumstances remain unchanged at 45c. to Milwaukee and 35c. to Duluth.

Pittsburg. May 7.

(*From Our Special Correspondent.*)

Coal.—There is but little new in the coal trade this week. All the mines are in operation, but not to full capacity, owing to the inability to secure a sufficient number of railroad cars. Shipments to lake ports are unsatisfactory, but additional cars are promised. The stockholders of the Pittsburg Coal Company met during the week and voted favorably on the proposition to issue $6,000,000 bonds to take up the floating debts for the purchase of additional coal properties. The project is expected to place the company in better shape financially than it has ever been. The Monongahela River Consolidated Coal and Coke Company has made no shipments to southern ports for a week, and now has about 6,000,000 bush. loaded. It has plenty of empty coal boats and barges, and the mines are in full operation. There has been no change in prices.

Connellsville Coke.—Production and shipment of coke are growing and a few plants have changed from a five to a six-day run. Prices are firm. Furnace coke is quoted at $2.25@2.50, and foundry at $2.75@3. The *Courier*, in its last issue, gives the production for the previous week at 220,779 tons. The shipments aggregated 11,746 cars, distributed as follows: To Pittsburg and river tipples, 3,961 cars; to points west of Pittsburg, 5,622 cars; to points east of Connellsville, 2,163 cars. This was an increase of 167 cars, compared with the shipments of the previous week.

San Francisco. May 1.

(*Special Report of J. W. Harrison.*)

Since the steamer *Sierra* sailed on April 8 there have been the following deliveries of Australian coal: *Star of Italy*, 2,204 tons; *St. Francis*, 2,570 tons; *Jabez Howes*, 775 tons; total, 5,740 tons. There are at present 12 vessels due to arrive here prior to July with 32,000 tons. Fully three-fourths of these have already gone out of first hands, hence there is but a little coal now afloat seeking buyers. There are on the chartered list from Australia to carry coals here 30 vessels, with a carrying capacity of 34,000 tons. Of these there are fully 12 which have not yet reached Newcastle. The last reported charters for coal are quoted below 10s. per ton from Newcastle, and as the Colonial crops are a comparative failure a number of carriers must seek this port for business. With the active competition of fuel oil for steam purposes, and the prices at which the same is being offered, it is an assured fact that Newcastle coals for this market must be offered at a reduction free on board from present asking prices. Already several steam colliers have been placed on the disengaged list here, as sale cannot be found for coast coals, both from British Columbia and Washington. Steamers of large capacity, carrying both passengers and freight, are now being converted into oil burners. If this continues successfully it will be a serious detriment to the sale of coal as a fuel.

Foreign Coal Trade. May 8.

Export trade continues quiet, though more inquiry is reported for coal to Mediterranean ports.

A recent charter reported is from Newport News, Va., to Marseilles, France, at 8s. 6d. ($2.04), early sailing. Another is from Philadelphia to a port on the west coast of Italy at 7s. 10½d. ($1.89), June sailing.

Messrs. Hull, Blyth & Co., of London and Cardiff, report, under date of April 26, that a very strong tone is apparent throughout the Welsh coal market; best Admiralty coals are very scarce and difficult to obtain, either for this month or next. Quotations are: Best Welsh steam coal, $3.96@$4.08; seconds, $3.78; thirds, $3.54; dry coals, $3.36; best Monmouthshire, $3.42@$3.54; seconds, $3.24; best small steam coal, $2.40; seconds, $2.16; other sorts, $1.92.

The above prices for Cardiff coals are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½ per cent discount.

A considerable amount of chartering has recently been done. Mediterranean and Eastern rates remain about unaltered: South American and Island rates show some improvement. Some rates from Cardiff are: Marseilles, $1.35; Genoa, $1.38; Naples, $1.32; Sabang, $2.76; Singapore, $2.76; Las Palmas, $1.56; St. Vincent, $1.74; Rio Janeiro, $3.06; Santos, $3.48; Buenos Aires, $3.36.

IRON TRADE REVIEW.

New York. May 8.

The iron market has been comparatively quiet, as many large concerns are practically out of the market for the rest of the year, or at any rate for six months to come. Small buyers are urgent in many cases, and premiums are paid for early deliveries; but the amount of these are difficult to determine.

Negotiations for a considerable amount of foreign material are in progress, but the results seem to be uncertain. It is believed, however, that concessions which will make contracts possible can be secured.

The threatened strike of blast furnace workers, which was postponed to June 1, is causing less anxiety in the Pittsburg District, and it is possible that it may not take place.

Consumption continues large in all lines, and there are no signs of an early cessation of demand for finished materials.

Birmingham. May 5.

(*From Our Special Correspondent.*)

It is said that No. 1 and No. 2 foundry irons have been selling in this district at $14 per ton, notwithstanding the public quotations of a $12 basis for No. 2 foundry. One of the representatives of the larger concerns in the State said that conditions were most favorable, shipments were steady and a good demand. The production in the State was materially improved during the month just past. Three furnaces were put in operation, 2 by the Tennessee Coal, Iron and Railroad Company, and one by the Sloss-Sheffield Steel and Iron Company. During this month there will be one and possibly two, one of them being the big new furnace of the Republic Iron and Steel Company at Thomas, and the other one of the city furnaces of the Sloss-Sheffield Company.

The following quotations are given: No. 1 foundry, $12.50; No. 2 foundry, $12; No. 3 foundry, $11.50; No. 4 foundry, $11; gray forge, $10.50; No. 1 soft, $12.50; No. 2 soft, $12.

Local foundrymen assert that immediate delivery iron is no less than $3 above the regular quotations in this district. It is also stated that some of the furnaces in this section have sold their production ahead for the entire year, and that already some inquiries are being made for iron for next year. So far as can be learned, however, no sales are being made for 1903.

The foundry and machine shop trade is good, though some of the shops are complaining that there is rate cutting. However, the proprietors are beginning to get together in the face of the high price of pig iron. Scrap iron is very high in this district also, ranging from $7.50 to $9 per ton.

The steel plant at Ensley is doing well in the way of production, 8 of the 10 open-hearth furnaces being in operation. The plant of the Alabama Steel and Wire Company is in full blast.

Buffalo. May 7.

(*Special Report of Rogers, Brown & Co.*)

We observe a little more inquiry for pig iron than has been seen for a few weeks back. This is coming principally from those, who, lacking faith in the market, did not cover earlier and from those who are finding deliveries on their contracts delayed from one cause and another. Furnaces are doing well as a rule in the matter of deliveries, but those in the South have had severe conditions to contend with and have gotten quite behind in nearly all cases. Consumption goes forward at a heavy rate and the market is strong.

Chicago. May 6.

(*From Our Special Correspondent.*)

The pig iron market continues to be very firm. Prices have advanced on Northern iron over last week $1 per ton, quotations to-day being as follows: No. 1 Northern, $21.50; No. 2 Northern, $21; No. 3 Northern, $20.50; No. 1 Southern, $19.15; No. 2 Southern, $18.65. Southern iron is probably bringing 50c. to $1 more than the quotations. Foundrymen are beginning to look gloomy; there is every prospect that the market for 1902 will be sold out within a few weeks. Lake Superior charcoal is already exhausted; there is none on the market at any price.

Coke is plentiful, so far as the West Virginia product is concerned, but Connellsville is still scarce. The price is unchanged, $5.25 for West Virginia and $5.50 for Connellsville.

Cleveland. May 6.

(*From Our Special Correspondent.*)

Iron Ore.—The reports that have been compiled in the offices of ore shippers show that the April movement down the lakes amounted to about 2,000,000 tons, if importations from Canada are included. Last year shipments did not start until after May 1, hence the shippers have a 2,000,000 ton start this summer or will have the same amount to move between May 1 and the close of navigation as was moved last year, computing the increase in this year's shipment to be equal to the April movement, which is the customary basis. This will make an interesting transportation question since there will be no increase in the ore shipment after May 1 and there has been an addition of 35 boats capable of carrying 3,000,000 tons during the season. The rates of carriage hold firm on the basis of 75c. from the head of the lakes with more boats than cargoes there and with the unloading ports already uncomfortably filled with boats demanding to be unloaded. The advantage is evidently with the shippers this year.

Pig Iron.—The pig iron consumers have ceased their importunities for material not from lack of desire for it, but from hopelessness of being able to satisfy the demand. There are, however, a few small transactions, mostly in off irons which are selling pretty well up to the price being charged for the standard grades. This is particularly true of bessemer and basic. A few small sales of No. 2 foundry are made both from the Valleys and Southern Ohio furnaces on the basis of $20 at the stacks. Southern furnaces are asking $16 Birmingham, and are making a few sales in this territory. Bessemer and basic producers are off the market, making no quotations.

Finished Material.—W. F. Bonnell, who went abroad ten weeks ago at the instance of the so-called independent sheet steel mills of this territory to purchase 40,000 tons of sheet bars and billets if possible, to supply the need of the plants which are unable to obtain their supply among the Corporation mills, returned to Cleveland yesterday. He reports that the foreign supply is already so well taken up that the prices are prohibitive for importation. He even intimates that were prices more reasonable it would be impossible to obtain the amount of steel he sought. The plate demand locally has come to be one of the features of the market and the supply is short. The quotation has generally advanced to the 1.70c. basis, Pittsburg, although the association has taken no such action. Store sales of plates 3-16 and less, are made at 1.90c.@2c. The supply of sheets is still up to the demand for them and there is hardly a possibility that it will be exhausted for this year's market unless there is a very decided impetus given to the buying. The demand is keen but the production is also very great. No. 10 gauge is quoted at 2.50c. out of store, being the base up to No. 16 and 3.50c. is asked for No. 27, being the basis for gauges between 17 and 28. Structural steel is still very largely in demand and as the local supply has about been exhausted, the news from abroad that the structural steel there is too high for importation has been discouraging, tending to stop some projects here that were all but under way.

Old Material.—The buying during the past week has been very brisk and the supply is increasing all the while. The prices have a downward tendency, but the market has not broken. Quotations therefore have not changed.

Philadelphia. May 7.

(*From Our Special Correspondent.*)

Pig Iron.—The signs in the market this week are not so assuring as they were a week or two ago as to a sufficiency of supply during the coming summer. Quite a number of consumers made up their mind a month ago not to crowd their future requirements on the market, but since then they have become somewhat unsettled in this conclusion. This is due to the evidences of an increasing demand, to the blowing out of some furnaces for repairs, to the generally oversold condition and to the inability of furnace managers to give any satisfaction as to what they can do in July. The situation in basic and bessemer pig is strained and the same condition exists, though in less degree, in foundry and forge irons. While there is no present inconvenience, there is a good deal of apprehension as to supplies during the summer. All makers who have been seen since Monday speak in the same tenor. While prices are nominally the same as last week, instances could be given where higher prices have been paid; in fact, nearly all the business done for what is called early delivery is done at prices above those quoted, which are for No. 1 foundry, outside price, $21.50; No. 2, $20.50; No. 2, plain, $19.50@$20; gray forge, $18@18.50; ordinary, $18; basic iron, $19.50.

Muck Bars.—Some little business is reported to-day at $33.50, makers' mill; nominal quotation is $32@$32.50.

Bar Iron.—A particular pressure just now is for steel bars, but it is only in small lots for early deliveries—in fact, for deliveries which it is impossible to take into consideration; prices are 1.90@2c., and material is not easy to get at that figure; common bar is being asked for by large consumers and large lots are wanted.

Sheet Iron.—It is impossible to gather any new information. No. 10 is 2.30c; No. 28, 3.30c.

Pipes and Tubes.—Strained conditions continue with reference to tubes, but quite an amount of business made up of small orders has been booked this week.

Billets.—In steel billets, some relief is anticipated from abroad, but the actual facts surrounding the pending negotiations are kept secret. The nominal quotation at mill is $33.50; but this does not represent the actual selling price, which it is impossible to give. Billets could be readily sold at $35, or $36 even.

Skelp Iron.—Is very high, very scarce and very much wanted.

Merchant Steel.—Apparently quiet, but this is due to the fact that it is almost impossible to place orders for anything that might be called early delivery.

Plates.—The consumers of boiler plate are very urgent for deliveries for what they have ordered and are placing orders for new work as it comes in. Considerable inconvenience has recently been experienced on account of postponed deliveries. Quotations for universals are 2c.; flange, 2.10c.; fire-box, 2.20c.; sheared, 2c.; marine, 2.30c.

Structural Material.—There is no apparent change in the stringent conditions of the market referred to heretofore. Premium prices have been agreed to on several small lots placed for local consumption. It is rumored that considerable business has been turned down in Eastern Pennsylvania, but those concerned decline to verify or contradict. Beams and channels are 1.80@1.90c.; angles, 1.80c.

Steel Rails.—Negotiations are pending for several lots of ordinary sections and girder rails.

Scrap.—All kinds of scrap are in more urgent demand than for several weeks; low phosphorus scrap is quoted at $26.50 to-day; heavy melting steel would bring $23; railroad scrap is quoted all the way from $24 to $26, but there is none in sight; machinery cast is being picked up every day or two at about $18.

Pittsburg. May 7.

(From Our Special Correspondent.)

There is but little change in the situation. Despite the known scarcity of pig iron many urgent inquiries are being received, and in some instances it has been found possible to accept orders for bessemer and gray forge, principally for late delivery. There is but little foundry iron to be had for any delivery, according to reports this week, but it is believed that some foundrymen contracted for more than their actual requirements, and there may be some in the market later in the year. Prices of all grades of pig iron continue firm and higher rates are likely to rule in the second half. Some large concerns, particularly the United States Steel Corporation, are said to be short of the bessemer iron required for the last quarter of the year. It is confidently believed, however, that there will be enough iron to go around. The threatened strike of blast furnace workers on June 1 is giving the manufacturers no concern at all. The reported statements of the leaders of the organization to the effect that official notices have been issued are not confirmed by furnace owners. No notices have been received by any of the concerns represented in the Pittsburg District, and no requests have been made for a conference. It has developed that the organizers of the workers have not had the success they expected, owing to the large number of foreigners employed at the Valley furnaces. This class of workmen refuse to entertain any proposition that will make a strike necessary. It is believed here that the movement for a change from a two to a three-turn system will quietly die out. The leaders of the workers still insist that they are in earnest.

The scarcity of steel has affected the independent sheet manufacturers, and as a result prices are firmer. The Burgess steel plant, recently purchased by the Whitaker Iron Company, the Laughlin Nail Company and A. F. Baumgarten, soon will be put in operation and will greatly relieve the situation. A few small lots of bessemer steel billets were sold during the week. No new business in finished material is being taken by mills, but dealers who have stocks are able to accept orders and make good deliveries. Structural material for delivery this year cannot be secured at any mill in this district and orders are in for delivery next year.

Most of the structural iron workers are on a strike for 50c. an hour, the American Bridge Company and other leading concerns having refused to pay more than 47½c., and some important work is tied up. Several companies having pressing contracts have agreed to the workers' terms. The difference seems so small that a settlement may soon be expected.

As indicated last week the convention of the Amalgamated Association of Iron, Steel and Tin Workers ratified the wage settlements and the present scales for the union rolling mills, sheet plants and tin plate works will continue for another year from July 1. Before the convention closed a number of recommendations were made of additions to the footnotes in the several scales. Conferences are to be requested with the various interests and the adoption of the new clauses will be urged. The granting of these demands will be optional with the manufacturing companies and a refusal will not result in a shutdown of the mills. There is no probability of a suspension of operations of any of the mills except for a lack of raw material.

The bi-monthly examinations of the sales sheets for iron, sheets and tin plate on which the wages of skilled workers are based under the Amalgamated Association sliding scale, will be made in a few days. There will be no change in the wages of the sheet or tin plate workers, but an advance for the puddlers and finishers in the rolling mills is expected.

Pig Iron.—Sales of bessemer pig iron for delivery in the second half and a few lots for early delivery, aggregating about 8,000 tons, were made this week at $19.50@20, Valley Furnaces. About 3,500 tons of gray forge were sold at $19.25, Pittsburg, for delivery up to January 1, and $20.25, Pittsburg, is asked for spot shipment. No sales of foundry No. 2 are recorded, but it is quoted at $20@$21 for second half delivery, and $21 to $22, Pittsburg, for early shipment.

Steel.—Sales of bessemer steel billets in small lots amounting to about 1,000 tons are reported at $32@$33. There is no change in finished steel prices. Steel bars and tank plates are still quoted at 1.60c.

Sheets.—The sheet market is firmer this week and better prices are being received for car-load lots. There is a general lack of activity in the independent mills, owing to the inability to secure steel. No. 28 black sheets are still quoted at 3.10@3.15c. for future delivery, and galvanized sheets at 4.47c. in car-load lots.

Ferro-Manganese.—Domestic, 80 per cent. continues at $52.50, and the foreign product is held at $50.

New York. May 9.

Pig Iron.—Sales are limited by the high prices, but the market is very firm and the amount of iron used very large. We quote for tidewater delivery: No. 1X. foundry, $20@$22.50; No. 2X, $19@$19.50; No. 2 plain, $18.50@$19.50; gray forge, $17.75@$18.25. For Southern iron on dock, New York, No. 1 foundry, $19.75@$21; No. 2, $18.50@$19.50; No. 3, $17@$18.50.

Bar Iron and Steel.—Prices are higher. We quote for large lots on dock, refined bars, 1.85@1.95.; soft steel bars, 1.83c.

Plates.—Mills are not particular about new business and charge high premiums for extras. We quote for tidewater delivery in carloads: Tank, ¼-in. and heavier, 1.78@2c.; flange, 1.88@2.10c.; marine,1.98 @2.20c.; universal, 1.78@1.98c.

Steel Rails.—There is nothing new in the general condition of the market. Foreign rails continue to be ordered in small lots. Standard sections are still nominally quoted at $28 at Eastern mills; light rails at $30@$33, according to weight.

Structural Material.—There is a steady demand, though no large sales are reported. We quote for forward delivery on large lots at tidewater as follows: Beams, 1.95@2.10c.; tees, 1.85@2c.; angles, 1.80 @2.05c.

Cartagena, Spain. April 19.

(Special Report of Barrington & Holt.)

Iron Ores.—Shipments for the week were 10,900 tons; up to date, 109,650 tons iron ores. Since our last report shipments of iron and manganiferous ores have been very brisk, and all classes of mineral have been in good demand. There are fair inquiries for new business, and prices are firm. The Subida Iron Ore Company has shipped a cargo of ore from Calera to Glasgow. Large quantities of ore are again coming down from the Calasparra mines, and the steamer *Ibex* took a large cargo of this ore to Middlesbrough to Bolckow-Vaughen. An American firm is in treaty for a contract for 250,000 tons of this ore, but there is said to be a difference of 6d. per ton between buyers and sellers.

Quotations for iron ores are f. o. b. Cartagena, or Portman; 50 per cent Portman, 6s. 6d.@6s. 9d.; low phosphorus, 7s.@7s. 6d.; special, 8s. 6d.; specular ore, 58 per cent iron, 9s.; magnetic ore, 60 per cent iron, 11s. 6d. for lumps, and 9s. 6d. for smalls. For manganiferous ores quotations are: No. 1, 20 per cent iron and 20 manganese, 14s. 3d.; No. 1, B, 25 iron and 17 manganese, 11s. 3d.; No. 2, 30 iron and 15 manganese, 10s. 3d.; No. 3, 35 iron and 12 manganese, 9s. 6d. All these manganiferous ores run about 11 per cent silica and under 0.03 phosphorus.

Other Minerals.—Shipment of one cargo, 1,200 tons, iron pyrites to Genoa is noted. The quotation for pyrites, 40 per cent iron and 43 sulphur, is 11s. per ton, f. o. b. Exports of zinc ore include 1,250 tons blende to Swansea and 2,725 tons to Antwerp.

CHEMICALS AND MINERALS.

New York. May 1.

Heavy Chemicals.—Deliveries are mostly on standing contracts. Prices are unchanged. Domestic chemicals, we quote, per 100 lbs., f. o. b. works, as follows: High-test alkali, in bags, 80@82½c. for prompt shipment, and 75@77½c. for forward; caustic soda, high-test, $1.90@1.92½ for early delivery, and $1.85@1.87½ for futures; bicarb. soda, ordinary, $1, and extra, $3; sal soda, 55c.; chlorate of potash, $8@$8¼ for prompt, and $7.75 for contracts. For foreign goods we quote per 100 lbs. in New York: Alkali, high-test, 90@92½c.; caustic soda, high-test, $2.25; sal soda, 65@67½c.; chlorate of potash, $10¼ @$10¾; bleaching powder, $1.55@$1.75, according to make and seller.

Imports in the quarter ending March 31 were: Bleaching powder, 33,239,862 lbs., against 31,765,502 lbs. last year; soda ash, 8,828,340 lbs., against 8,272,-281 lbs.; caustic soda, 1,121,165 lbs., against 851,596 lbs.; sal soda, 899,220 lbs., against 1,265,735 lbs.; chlorate of potash, 318,356 lbs., against 169,563 lbs. Our re-exports were: Bleaching powder, 112,471 lbs., against 1,376 lbs. last year; soda ash, nil, against 4,313 lbs.; caustic soda, 348,088 lbs., against 268,221 lbs.; sal soda, nil, against 2,170 lbs.; chlorate of potash, nil, against 41,920 lbs.

Acids.—Seasonably active. Blue vitriol is in better request, especially for export. A promising foreign consumer is Greece, which has imported from New York alone during the first 3 months this year a total of 814,365 lbs., as compared with only 7,462 lbs. for the whole year of 1901. Already American manufacturers are cutting out the British trade, and last year the American Metal Company, of New York, obtained a contract for 500 tons for the season of 1902 at £18 10s. per ton, c. i. f. Patras, Greece. This price is $5.84 per ton less than the nearest competitor. It is estimated that Greece could use about 9,000 1902, but as yet the imports have not been over 3,000 tons, owing to the high cost of the product.

Quotations are per 100 lbs. as below, unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity.

Blue Vitriol	$4.50@4.62½	Oxalic com'l	$4.60@5.00
Muriatic, 18 deg.	1.50	Sulphuric, 50 deg., bulk ton	13.50@15.50
Muriatic, 20 deg.	1.62½	Sulphuric, 60 deg.	1.00
Muriatic, 22 deg.	1.75	Sulphuric, 60 deg., bulk	18.00@20.00
Nitric, 36 deg.	4.00	Sulphuric, 66 deg.	1.20
Nitric, 38 deg.	4.25	Sulphuric, 66 deg., bulk	21.00@23.00
Nitric, 40 deg.	4.50		
Nitric, 42 deg.	4.87½		

Brimstone.—Recent arrivals have replenished stocks in consumers' hands, hence the market is again quiet. Spot best unmixed seconds are quoted at $23 per ton, and shipments $22.50, while thirds are $2½ less than these prices. Prices at New York have been well maintained this year, as will be seen by the following averages, per long ton:

	—April—		—Jan.-April—	
	1901.	1902.	1901.	1902.
Spot, seconds	$21.78	$23.28	$23.02	$23.91
Spot, thirds	19.78	20.78	21.02	21.41
Shipments, seconds	21.19	22.53	21.44	22.47
Shipments, thirds	19.19	20.03	19.44	19.97

The advance this year of 89c. in spot best unmixed seconds and 39c. in thirds and $1.03 in shipments of seconds and 53c. in thirds shows that the syndicate of producers is determined to follow a high-price policy. How long it can do so depends on the paper pulp trade, which has not yet built pyrites burning plants. As far as the acid and allied industries are concerned, they are already using considerable quantities of pyrites, instead of brimstone, as the former is much cheaper.

Exports of brimstone from Sicily in the 3 months ending March 31 were 136,176 tons, against 145,703 tons in the corresponding period last year. The falling off of 9,527 tons in exports this year has resulted in increasing stocks to 278,871 tons, as against 200,-520 tons on April 1, 1901. High prices are responsible for this accumulation of brimstone. Nevertheless no change is likely to be made by the syndicate until the July melting, when it is expected a reduction of 1s. to 3s. per ton will be made to meet the offers of dissidents.

Pyrites.—Market conditions are stationary, although fertilizer makers are consuming much sulphuric acid. Prices for pyrites hold firm. Importers have chartered vessel room from Spain for this month at 9s. 3d. ($2.22), which shows a slightly easier tone in the freight market. Comparing the average invoice value of imported pyrites with that of 1901, we find a decrease in 1902 of fully $1 per ton, owing partly to the reduction in the cost of copper ore following a cut in the metal market. It should be stated here that nearly all the copper pyrites imported from Spain has a metallic content of about 2 per cent, which is recovered and sold as casting copper. In 1901 the total imports of copper pyrites were about 140,000 tons, which had a metallic content of some 6,000,000 lbs. Besides this, there were considerable imports of iron pyrites.

Quotations are f. o. b.: Mineral City, Va., lump ore, $5 per ton, and fines, 10c. per unit; Charlemont, Mass., lump, $5, and fines, $4.75. Spanish pyrites 12@13c. per unit, New York and other Atlantic ports. Spanish pyrites contain from 40 to 51 per cent of sulphur; American, from 42 to 44 per cent.

Sulphate of Ammonia.—Early arrivals of gas liquor are held at $3 per 100 lbs. for good qualities, while off-color, suitable for aqua and anhydrous ammonia making, can be had at a shade less. In April prices for 24@25 per cent gas liquor averaged $2.97 per 100 lbs., and for the 4 months $2.92, showing an improvement over last year.

Potash Salts.—Reports are current that the Virginia-Carolina Chemical Company has secured control of some independent potash salt mines and works in Hanover, Germany. It is also announced that some London capitalists are after properties, and that geological experts are examining potash fields in the territories where the Kali Syndicate is doing its best work. Briefly, it looks as though efforts are making to break the monopoly now existing in the potash salt industry.

Saltpetre.—Demand is light, hence imports are smaller than last year, and stocks are almost depleted. Prices, however, continue firm, at $3.20@$3.37½ per 100 lbs. for crude; while the refined article is held at $4.25@$4.62½ per 100 lbs., according to quantity and time of shipment. Statistics of crude saltpetre compare with last year as follows, in bags:

	1901.	1902.	Changes.
U. S. Imports, Jan-Apr.	25,076	17,180	D. 7,896
Expected to arrive	9,661	13,139	I. 3,478
Stocks, April 30	3,000	1,200	D. 1,800
Visible supply	12,661	14,339	I. 1,678
Deliveries, Jan-Apr.	25,476	18,280	D. 7,196

Important changes this year are a decrease of 31 per cent in imports and 28 per cent in deliveries.

Nitrate of Soda.—The spot market has declined to $2.07½ per 100 lbs., owing to heavy arrivals. Futures have been offered and declined at $1.97½ for June to December deliveries. The European market has also declined, owing to the reported failure of a house in Germany. The holdings of this firm have been taken up by a syndicate, which has prevented a serious break in the nitrate market. Nevertheless the general tone of the market is weaker, as the end of the European season is approaching. Consumption has fallen off somewhat, owing to the high prices. For next season, however, the coast market appears to be firm. The April sailings for Europe were 1,900,000 qtls., and loadings, May 1, are cabled as 600,000 qtls. Shipments to the United States in April were 320,000 qtls., and loadings May 1 were 190,000 qtls. The steamship *Lustilcigh* sailed on May 1 for Baltimore with 36,000 bags, and the *Cuzco* on May 3 for New York with 27,000 bags.

The average prices of nitrate of soda, as quoted by importers at New York, during April and the 4 months this year, compare with the corresponding period in 1901, as below, per 100 lbs:

	—April—		—Jan.-April—	
	1901.	1902.	1901.	1902.
Spot	$1.82	$2.38	$1.83	$2.23
Shipments	1.82	2.14	1.88	2.06

Thus will be seen the result of harmony by combination. The increase in spot prices this year is 40c., and in shipments 18c., placing the average among the highest on record.

Messrs. Mortimer & Wisner's monthly statement of nitrate of soda, dated New York, May 1, gives the following statistics:

	1902. Bags.	1901. Bags.	1900. Bags.
Imp. into Atlantic ports from west coast So. Am. from Jan. 1, 1902, to date	298,432	417,659	327,553
From Europe	.....	.....	2,063
Total	298,432	417,659	329,616
Stock in store and afloat May 1, 1902, in New York	43,273	25,034	34,573
Boston	.....	.....	.....
Philadelphia	1,300	.....	.....
Baltimore	1,500	.....	19,585
Norfolk, Va.	.....	.....	.....
Charleston	.....	.....	.....
Savannah	.....	.....	.....
To arrive, due Aug. 15, 1902	386,260	441,317	237,350
Visible supply to Aug. 15, 1902	432,333	466,351	291,508
Stock on hand Jan. 1, 1902	77,517	13,446	9,586
Deliveries past month	63,369	64,117	86,220
Deliveries since Jan. 1 to date	329,876	406,071	285,044
Total yearly deliveries	.....	1,308,820	1,176,651
Prices current, May 1, 1902	$2.15	$1.82½	$1.82½

Concerning the Chilean market, Messrs. Jackson Brothers, of Valparaiso, write us under date of April 5 as follows: Nitrate of soda has been devoid of any interest and scarcely any transactions have been made, which in a measure can be attributed to the Easter holidays, and to the falling off in consumption during the last month. At the same time producers show little disposition to operate at any decline on former prices, owing to the scarcity of disposable nitrate for prompt deliveries. For Iquique nitrate there is a little demand at 6s. 9d. alongside, whereas in outside ports 95 per cent nitrate is offered at 6s. 8½d., without finding buyers. For August delivery, 6s. 9½d. alongside would be paid, but producers will not operate for forward deliveries. Exports for March are cabled as 3,253,000 qtls., making a total for the first quarter of 7,272,000 qtls., as against 6,168,500 qtls. for the same period last year. We quote: 95 per cent, April-June, 6s. 8½d.; July, 6s. 9½d.; August-November, 6s. 10d., and 96 per cent, 6s. 10½d.; all ordinary terms. The price of 6s. 8½d., with an all-round freight of 18s. 9d., stands in 8s. 5d. per cent net, cost and freight without purchasing commission. Reported sales for the fortnight ending April 5 are 64,000 qtls., and resales, 33,000 qtls.

Phosphates.—Foreign buying is only moderate, while home consumption is pretty good. Prices are nominally unchanged. Charters have been booked from Port Royal to Belfast, Ireland, at 11s. 6d. ($2.76), and from Coosaw to London at 13s. ($3.12), both prompt sailing.

Reports are made that phosphate rock has been found in Sabine County, Texas, about 80 miles north of Beaumont, the great petroleum center.

A comparative statement of the monthly average prices of American phosphates, both for home and foreign consumption, is given below:

Florida:—	—April— 1901	—1902.	—Jan.-April— 1901	—1902.
High-grade, f. o. b.	$6.75	$7.41	$6.87	$7.48
High-grade, c. i. f.	11.62	10.34	12.03	10.92
Land pebble, f. o. b.	3.93	3.13	3.96	3.13
Land pebble, c. i. f.	8.88	6.83	9.23	7.23
Peace River, f. o. b.	2.63	2.38	2.71	2.38
Peace River, c. i. f.	7.60	5.85	7.69	6.06
Tennessee:—				
78 @ 80%, f. o. b.	3.38	3.50	3.23	3.50
78 @ 80%, c. i. f.	10.73	9.78	10.93	10.24
78% (domestic)	3.00	3.13	3.55	3.13
70 @ 75%, f. o. b.	2.50	2.46	2.48	2.46
South Carolina:—				
Land rock, f. o. b.	3.25	3.25	3.87	3.25
Land rock, c. i. f.	7.00	5.98	7.50	5.98
River rock, f. o. b.	2.63	2.88	3.25	2.94

These prices show a marked falling off abroad, which is partly accounted for by the lower ocean freight rates, though competition for trade among superphosphate manufacturers has doubtless been keenly felt by phosphate exporters. Domestic markets also show some fluctuation, but the difference is not as great as in the export trade, which takes a considerable part of our output.

We quote phosphate prices below:

Phosphates.	Per ton F. o. b.	C. i. f. Un. Kingdom or European Ports. Unit.	Long ton.
*Fla. hard rock (17@80%)	$6.50@7.00	6¼@6¾d.	$9.75@10.53
*Fla. land peb. (68@73%)	3.00@3.25	4¾@5d	6.65@ 7.00
*Fla. Peace Riv. (58@63%)	2.25@2.50	4¾@5d	5.70@ 6.00
†Tenn., (78@80%) export	3.75	5½@6d.	8.58@ 9.36
†Tenn., 78% domestic	3.00@3.25	.....	.....
†Tenn., 75% domestic	2.75@3.00	.....	.....
†Tenn., 73@74% domestic	2.40	.....	.....
†Tenn., 70@72% domestic	2.10@2.25	.....	.....
‡So. Car. land rock	3.25	4½@5d	5.67@ 6.30
‡So. Car. river rock	2.75@3.00	.....	.....
Algerian (63@68%)	.....	5¾@6½d.	7.48@ 8.45
Algerian (58@63%)	.....	5¼@6d.	6.30@ 7.20
Algerian (53@58%)	.....	5 @5¼d.	5.50@ 5.78

*Fernandina, Brunswick or Savannah.
†Mt. Pleasant. ‡On vessels, Ashley River.

Liverpool. April 23.

(*Special report of Joseph P. Brunner & Co.*)

The market for heavy chemicals is quiet, as regards fresh business, while quotations remain steady. Soda ash firm. We quote nearest spot range for tierces about as follows: Leblanc ash, 48 per cent, £5 15s.@£6; 58 per cent, £6 2s. 6d.@£6 7s. 6d. per ton, net cash. Ammonia ash, 48 per cent, £4 5s.@£4 10s.; 58 per cent, £4 10s.@£4 15s. per ton, net cash. Bags, 5s. per ton under prices for tierces. Soda crystals are generally £3 7s. 6d. per ton, less 5 per cent for barrels, or 7s. less for bags, with special terms for certain export quarters. Caustic soda makers show no disposition to make any concession on prices. We quote: 60 per cent, £8 15s.; 70 per cent, £9 15s.; 74 per cent, £10 5s.; 76 per cent, £10 10s. per ton net cash. Bleaching powder is dull at nominally £6 15s. @£6 17s. 6d. per ton, net cash for hardwood, with special terms for Continental and a few other export quarters. Chlorate of potash is quiet at 3d. per lb. net cash. Bicarb. soda continues steady at £6 15s. per ton, less 2½ per cent. for the finest quality in 1 cwt. kegs, with usual allowances for larger packages; also special terms for a few favored markets. Sulphate of ammonia is very scarce for prompt delivery and buyers have difficulty in finding sellers. For May delivery the nearest range for good gray 24@25 per cent, in double bags, f. o. b. here, is about £12 7s. 6d. @£12 12s. 6d. per ton, less 2½ per cent. Nitrate of soda has weakened and the squeeze seems about over. For immediate delivery holders quote £10 12s. 6d.@£10 15s. per ton, less 2½ per cent for double bags f. o. b. here, but considerably less would be accepted for May and forward delivery.

METAL MARKET.

New York. May 8.

GOLD AND SILVER.

Gold and Silver Exports and Imports.

At all United States Ports in March and Year.

Metal	March. 1901.	1902.	Year. 1901.	1902.
Gold.				
Exports	$490,269	$4,732,181	$9,128,240	$15,323,143
Imports	2,520,455	2,609,060	8,645,355	5,698,740
Excess.	I. $2,030,186	E. $2,123,121	E. $482,885	E. $9,624,403
Silver.				
Exports	$5,150,186	$3,329,255	$14,519,674	$11,762,653
Imports	2,706,366	2,296,203	8,085,093	6,409,479
Excess.	E. $2,443,820	E. $1,033,052	E. $6,434,581	E. $5,353,17

These figures include the exports and imports at all United States ports, and are furnished by the Bureau of Statistics of the Treasury Department.

Gold and Silver Exports and Imports, New York.

For the week ending May 8, 1902, and for years from January 1, 1902, 1901 and 1900.

Period.	Gold. Exports.	Imports.	Silver. Exports.	Imports.	Total Excess Exports or Imports.
Week	$750	$2,982	$500,685	$12,964	E. $485,489
1902	16,443,101	1,034,322	11,141,607	470,973	E. 20,074,413
1901	16,906,994	1,030,892	12,907,430	1,481,087	E. 27,302,445
1900	9,689,608	1,328,894	13,914,469	1,641,059	E. 20,634,824

Only small gold exports this week; silver went chiefly to London. Imports principally from Central America.

Financial Notes of the Week.

The flurry in Wall Street this week seems to have had little or no effect upon general business. Money is in more demand and higher, which will probably check speculation to some extent. No further exports of gold are noted.

The statement of the New York banks, including the 63 banks represented in the Clearing House, for the week ending May 3 gives the following totals, comparison being made with the corresponding weeks of 1901 and 1900:

	1900.	1901.	1902.
Loans and discounts	$787,770,000	$890,450,400	$904,162,500
Deposits	869,155,300	973,111,600	968,189,600
Circulation	21,218,100	31,132,900	31,049,300
Specie	165,479,800	182,302,700	173,850,400
Legal tenders	67,787,500	71,955,300	75,681,000
Total reserve	$233,267,300	$254,258,000	$249,531,400
Legal requirements	217,288,825	243,277,900	242,047,400
Balance surplus	$15,978,475	$10,980,100	$7,484,000

Changes for the week this year were increases of $10,768,400 in loans and discounts, $13,643,000 in deposits, $79,000 in circulation, $756,400 in specie, and $677,300 in legal tenders; a decrease of $1,977,050 in surplus reserve.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison is made with the holdings at the corresponding date last year:

	—1901— Gold.	Silver.	—1902— Gold.	Silver.
N. Y. Ass'd	$182,302,700	.....	$173,850,400	.....
England	177,199,095	.....	179,629,360	.....
France	482,183,935	$219,885,245	514,305,995	$221,714,840
Germany	156,415,000	71,930,000	186,670,000	69,050,000
Spain	70,010,000	83,420,000	70,495,000	92,145,000
Neth'l'ds	25,286,500	28,635,000	23,915,500	33,089,500
Belgium	14,570,000	7,285,000	15,690,000	7,845,000
Italy	76,080,000	9,623,500	80,550,000	10,665,500
Russia	351,875,000	32,580,000	368,360,000	27,495,000

The returns of the Associated Banks of New York are of date May 3, and the others May 1, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports only gold.

The silver market advanced snarply this week, mostly on speculative demand in London, although India was a moderate buyer on the advance. The higher prices, however, brought out sellers and market closes weak in London with sellers at 23 11-16d.

The United States Assay Office, in New York, reports receipts of 61,000 oz. silver for the week.

Indian exchange has been somewhat quieter, but the demand for Council bills in London was fair, and the amount offered was placed at an average of 15.94d.

per rupee. The low price of silver has somewhat improved the demand for Indian account, and purchases of a considerable quantity are reported.

Shipments of silver from London to the East for the year up to April 24 are reported by Messrs. Pixley & Abell's circular as follows:

	1901.	1902.	Changes.
India	£2,759,210	£2,565,585	D. £193,625
China	314,125	16,500	D. 297,625
The Straits	79,976	250	D. 79,726
Totals	£3,153,311	£2,582,335	D. £570,976

Arrivals for the week, this year, were £171,000 in bar silver from New York, £20,000 from the West Indies, £9,000 from the Straits, and £4,000 from India; total, £204,000. Shipments were £158,000 in bar silver to Bombay, and £15,000 to Calcutta; total, £173,000.

The coinage executed at the mints of the United States in April and the 4 months this year is reported by the Bureau of the Mint as below:

Denominations.	April. Pieces.	April. Value.	Jan.-April. Value.
Double eagles	174,006	$3,480,120.00	$17,700,900.00
Eagles	14	140.00	520.00
Half eagles	7	35.00	240.00
Quarter eagles	8	20.00	84,062.50
Total gold	174,035	$3,480,315.00	$17,785,722.50
Dollars	1,500,065	1,500,065.00	6,836,377.00
Half dollars	1,660,065	830,032.50	1,887,825.50
Quarter dollars	3,228,677	807,169.25	2,281,247.25
Dimes	2,510,035	251,006.50	746,037.70
Total silver	8,898,872	$3,388,273.25	$11,751,487.45
Five c. nickels	3,053,165	152,658.25	502,658.25
One c. bronze	11,065,165	110,651.65	295,651.65
Total minor	14,118,330	$263,309.90	$798,309.90
Total coinage	23,191,237	$7,131,898.15	$30,335,519.85
Total, 1901	12,611,300	$21,734,660.00	$58,240,223.00

The decrease in the total coinage this year is $27,904,703, or 48.2 per cent, chiefly in gold.

The Treasury Department's statement of the amount and kind of money in the United States on May 1 is as follows:

	Total.	In Treasury.	In Circulation.
Gold coin (inc. bullion in Treasury)	$1,183,652,727	$242,945,286	$637,432,952
Gold certificates	.....	.....	303,274,489
Silver dollars	537,603,809	19,076,975	69,403,330
Silver certificates	.....	.....	449,123,504
Subsid. silver	95,299,190	12,444,591	82,854,599
Treasury notes, 1890	32,638,000	89,427	32,548,573
U. S. notes	346,681,016	8,572,902	338,108,114
Currency certificates	.....	.....	.....
Nat. bank notes	356,987,399	8,982,718	348,004,681
Total	$2,552,862,141	$292,111,899	$2,260,750,242

Population of the United States May 1, 1902, estimated at 78,890,000; circulation per capita, $28.66. For redemption of outstanding certificates an exact equivalent in amount of the appropriate kinds of money is held in the Treasury, and is not included in the account of money held as assets of the Government. This statement of money held in the Treasury as assets of the Government does not include deposits of public money in national bank depositaries to the credit of the Treasurer of the United States, and amounting to $114,305,682. The total amount in circulation shows an increase of $8,702,185 over April 1; and an increase of $65,446,007 over May 1, 1901.

Prices of Foreign Coins.

	Bid.	Asked
Mexican dollars	$0.41	$0.44
Peruvian soles and Chilean pesos	.37	.41½
Victoria sovereigns	4.86	4.88
Twenty francs	3.86	3.88
Twenty marks	4.74	4.85
Spanish 25 pesetas	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

May	Sterling £ change	Silver N. Y. Cts.	Silver London Pence.	Copper Lake Cts. per lb.	Copper Electrolytic per lb.	Copper London £ per ton	Tin, cts. per lb.	Lead cts. per lb.	Spelter N.Y. cts. per lb.	Spelter St. L. cts. per lb.
3	4.87¼	50¾	23⅝	11¾ @12	11⅝ @11½	52¾	28¾	4.05 @4.10	4.35	4.15
4	4.87¼	50⅝	23⅛	11¾ @12	11⅝ @11½	....	23¾	4.05 @4.10	4.35	4.15
5	4.87¼	50⅝	23⅝	11¾ @12	11½ @11⅝	52⅞	28¾	4.05 @4.10	4.32½	4.12½
6	4.87⅛	51	23⅛	11⅜ @12	11½ @11⅝	53⅛	28½	4.05 @4.10	4.32½	4.12½
7	4.87⅛	51⅛	23⅛	12	11⅝	53¼	28¾	4.05 @4.10	4.32½	4.12½
8	4.87⅛	51¼	23¾	12 @12⅛	11⅝ @11¾	53¼	29¼	4.05 @4.10	4.32½	4.12½

London quotations are per long ton, (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars: the price of electrolytic cathodes, is usually 0.25c lower than these figures.

Copper.—The market displays more activity. Consumers generally have taken hold freely, and a large business is reported both for early and distant shipment. Though the demand has been freely met by producers, prices show, nevertheless, a fair improvement. We quote Lake copper at 12@12⅛c.; electrolytic in cakes, wirebars and ingots at 11⅝@11¾c., in cathodes at 11⅜@11½c.; casting copper at 11½@11⅝c.

The market for standard copper advanced from £52 15s. on last Friday, to £53 10s. on Wednesday; and it closed April 8 at £53 5s. for spot, £53 5s. for three months.

Refined and manufactured sorts we quote: English tough, £55 10s.@£56; best selected, £56 10s.; strong sheets, £68; India sheets, £65 10s.; yellow metal, 6d.@6⅛d.

Exports of copper from New York and Baltimore for the week ending May 7, are reported by our special correspondents as follows: To Great Britain, 639 tons; Germany, 573; Holland, 769; France, 50; Italy, 13; China, 6; Manila, P. I., 7; total, 2,057 tons. Imports were 300 tons copper ore and 42 tons copper, chiefly from London.

Tin.—The foreign market was rather active, but in ours not much was done, as consumers were not ready to pay the higher prices. Spot tin is again rather scarce, and at the close of the week the demand has improved. We quote spot at 29½c., May at 28¾c., and June at 28½c.

The foreign market which closed last Friday at £130 15s. for spot, £127 for three months, ruled the same on Monday; on Tuesday advanced about 7s. 6d.; on Wednesday further 10s., and on Thursday the closing quotations are cabled as £132 15s. for spot, £130 for three months.

Stocks of tin on May 1 are reported as follows, in long tons, of 2,240 lbs.:

	Store.	Afloat.	Totals.
London	4,371	2,715	7,086
Holland	788	422	1,210
U. S., except Pacific ports	2,990	4,310	7,300
Totals	8,149	7,447	15,596

On May 1, 1901, the stocks reported were 16,128 tons. This year's statement shows a decrease of 532 tons.

Lead.—The market is quiet. We quote 3.97½@4.05c. St. Louis, 4.05@4.10c., New York.

The foreign market is slightly lower, Spanish lead being quoted at £11 11s. 3d@£11 13s. 9d.; English lead, £11 15s.@£11 16s. 3d.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is dull but prices are steady. Missouri metal is quoted at 3.97½@4c.; desilverized at 4.05c.

Spanish Lead Markets.—Messrs. Barrington & Holt write from Cartagena, Spain, April 19: The price of silver during the week has been 1,350 reales per oz. The exchange has gone up by 15c., making it 34.35 pesetas to £1. The local quotation for pig lead on wharf has been 63.75 reales per qtl., which on above exchange is equal to £10 8s. 2d. per ton, of 2,240 lbs., f. o. b. Cartagena. Exports of lead have been: 4,028 tons to Newcastle, 500 tons to London, and 287 tons to Marseilles. Other exports have been: 10,000 car-loads lead ore, and 1,725 car-loads silver bars to Marseilles.

Spelter.—The market is very dull. Consumers have covered their near-by wants, and are not buying at present. We quote St. Louis at 4⅛c., New York 4.32½c.

The foreign market is somewhat higher, good ordinaries being quoted at £18 7s. 6d., specials 5s. higher.

St. Louis Spelter Market.—The John Wahl Commission Company telegraphs us as follows: Spelter is firm and quoted at 4.15c., with fairly active demand.

Antimony—Is unchanged. We quote Cookson's at 9¾@10c.; Hallett's, 8@8⅛c.; Hungarian, Japanese, Italian and U. S. Star at 7¾c.

Minor Metals and Alloys.—Wholesale prices, f. o. b. works, are as follows:

Aluminum.	Per lb.
No. 1, 99% ingots	33@37c.
No. 2, 90% ingots	31@34c.
Rolled sheets	4c. up
Alum-bronze	20@23c.
Nickel-alum	33@39c.
Bismuth	$1.50
Chromium (over 90%)	1.00
Copper, red oxide	50c.
Ferro-Molyb'um (50%)	$1.25
Ferro-Titanium (10%)	90c.
Ferro-Titanium (20%)	$1.10

Aluminum.	Per lb.
Ferro-Tungsten (37%)	28c.
Magnesium	$2.75
Manganese (over 90%)	1.00
Mangan'e Cop. (20% Mn)	32c.
Mangan'e Cop. (30% Mn)	38c.
Molybdenum (Best)	$1.82
Phosphorus	50c.
American	70c.
Sodium metal	50c.
Tungsten (Best)	62c.

Variations in price depend chiefly on the size of the order.

Nickel.—The price continues firm at 50@60c. per lb., according to size and terms of order.

Platinum.—Consumption continues good. Ingot platinum in large lots brings $19.50 per oz. in New York.

Chemical ware (crucibles and dishes), best hammered metal from store in large quantities, is worth 82c. per gram.

Quicksilver.—The New York price is $48 per flask for large lots, with a slightly higher figure for small orders. In San Francisco quotations are steady, $46.50@$47 being named for domestic orders, with $44 quoted for export. The London price is £8 15s. per flask, with the same figure quoted from second hands.

Average Prices of Metals per lb., New York.

	Tin. 1902.	Tin. 1901.	Lead. 1902.	Lead. 1901.	Spelter. 1902.	Spelter. 1901
January	23.54	26.51	4.000	4.350	4.27	4.12
February	24.07	26.68	4.075	4.350	4.15	4.01
March	26.32	26.03	4.075	4.350	4.28	3.91
April	27.77	25.93	4.075	4.350	4.37	3.98
May	....	27.12	....	4.350	....	4.08
June	....	28.00	....	4.350	....	3.[illegible]
July	....	27.85	....	4.350	....	3.98
August	....	26.78	....	4.350	....	3.98
September	....	25.31	....	4.350	....	4.08
October	....	26.62	....	4.350	....	4.23
November	....	26.67	....	4.350	....	4
December	....	24.36	....	4.153	....	4.[illegible]
Year	....	26.54	....	4.334	....	4.0[illegible]

Average Prices of Copper.

Month.	New York Electrolytic. 1902.	New York Electrolytic. 1901.	New York Lake. 1902.	New York Lake. 1901.	London Standard. 1902.	London Standard. 1901
January	11.053	16.25	11.322	16.77	49.43	71.78
February	12.173	16.38	12.378	16.90	55.16	71.17
March	11.882	16.42	12.188	16.94	53.39	69.54
April	11.618	16.43	11.986	16.94	52.79	69.61
May	....	16.41	....	16.94	....	69.[illegible]
June	....	16.38	....	16.90	....	68.83
July	....	16.31	....	16.61	....	67.60
August	....	16.25	....	16.50	....	66.34
September	....	16.25	....	16.54	....	65.97
October	....	16.25	....	16.60	....	64.11
November	....	16.224	....	16.33	....	64.51
December	....	13.845	....	14.36	....	62.34
Year	....	16.117	....	16.53	....	66.79

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower

Average Prices of Silver, per ounce Troy.

Month.	1902. London. Pence.	1902. N. Y. Cents.	1901. London. Pence.	1901. N. Y. Cents.	1900. London. Pence.	1900. N. Y. Cents
January	25.62	55.56	28.97	62.82	27.30	59.39
February	25.41	55.09	28.13	61.06	27.40	59.76
March	25.00	54.23	27.04	60.63	27.59	59.81
April	24.34	52.72	27.30	59.29	27.41	59.59
May	....	....	27.43	59.64	27.56	59.98
June	....	....	27.42	59.57	27.81	60.42
July	....	....	26.96	58.46	28.28	61.25
August	....	....	26.94	58.37	28.13	61.14
September	....	....	26.95	58.26	28.85	62.65
October	....	....	26.62	57.59	29.58	63.85
November	....	....	26.12	56.64	29.66	64.04
December	....	....	25.46	55.10	29.68	64.14
Year	....	....	27.11	58.95	28.27	61.33

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

LATE NEWS.

BY TELEGRAPH.

(From Our Special Correspondent.)

Beaumont, Texas, May 7.—There has been no sudden cessation in the flow of the gushers on Spindle Top. The report started, and sent out by telegraph to all parts of the country, caused great excitement here. The committee had their gushers in different portions of field turned on. Two had no compressed air connections and flowed a good stream; one other flowed after being agitated. Each gusher was allowed to flow only for a few minutes. A storm prevented other wells being tested. The test demonstrated the fact that the wells still gush, but furnished no idea of how much oil the wells would deliver into tanks in 24 hours' run. The wells vary so much that it is difficult to take any one as indicating the capacity of the field. Some wells, which have been badly finished, will not flow; others flow under constant air pressure; others, after being agitated for a few minutes, will flow without more assistance, while a very few will force oil into tanks half a mile distant with their own pressure. Most of the wells, however, will not do so unless natural gas or compressed air is turned in. These same wells will probably flow if not attached to a pipe line. Compressed air is being used by some companies and the present air plants cannot supply the demand. Those using air appear to obtain lots of oil. The general opinion here is that the pressure has decreased very much in the last 30 days, and that to obtain a good flow of oil into tanks mechanical means must be applied in most cases.

STOCK QUOTATIONS.

NEW YORK.

Company and Location.	par val	May 1. H.	May 1. L.	May 2. H.	May 2. L.	May 3. H.	May 3. L.	May 5. H.	May 5. L.	May 6. H.	May 6. L.	May 7. H.	May 7. L.	Sales
Alamo, Colo.	$1									.05				2,000
Alice, Mont.	25													
Amalgamated c., Mont	100	66.50	65.75	66.63	65.00	66.00	65.00	66.50	65.13	67.00	65.63	68.38	66.63	109157
*Anaconda c., Mont	25			112.		113¼		112.	110⅝	112	110½	114.	112⅛	1,875
Anaconda Gold, Colo.	5							.18				.19		700
Argentum-Jun., Colo.	2	.04⅛												1,500
Belcher, Nev.	3													
Best & Belcher, Nev.	3			.26	.25					.30				2,200
Brunswick, Cal.	1	.14				.15		.15	.13			.12		4,900
Chrysolite, Colo.	50													
Comstock T., Nev.	100	.06¾		.06		.06⅞		.06¾		.06¾		.06		14,500
Comstock Bonds, Nev.	100													
Con. Cal. & Va., Nev.	2½			1.65		1.65								300
Cripple Cr. Con., Colo.	1			.07										1,000
Elkton, Colo.	1							.68	.67					500
Golden Fleece, Colo.	1	.29				.30								400
Greene Con., Mex.	10	23.50	23.25	29.50	24.00	27.00	25.75	30.50	27.63	31.25	30.50	31.38	28.00	24,705
Hale & Norcross, Nev.	3													
Horn Silver, Utah	25													
Isabella, Colo.	1			.25		.25				.25	.24	.25		2,100
Jack Pot, Colo.	1													
Little Chief, Colo.	1							.13				.13		800
Mexican, Nev.	3													
Mine Securities, U. S	100	7.50	7.25	7.38	7.25	7.38		7.38	7.25	7.00		7.25		4,300
Mollie Gibson, Colo.	5			.10										530
Ontario, Utah	100	9.25								8.00				80
Ophir, Nev.	3					1.70				1.80				400
Pharmacist, Colo.	1													
Phoenix, Ariz.	1													
Portland, Colo.	1							1.80				1.80		300
Potosi, Nev.	3			.28		.30	.28			.27				1,000
Quicksilver, Cal.	100													10
Quicksilver pf., Cal.	100													
Sierra Nevada, Nev.	3			.30										400
Small Hopes, Colo.	20							.45						100
Standard Con., Cal.	10													
Tenn. C., Tenn.	25	13.00	12.50	12.88						12.00		12.50	11.50	1,150
Union Copper, N. C.	10	4.13	4.00	4.00	3.88	3.75		3.75		4.00		4.00		2,800
White Knob, Ida.	100	25.50		25.75	25.00			24.00	23.50	25.25	24.13	24.25		2,050
Work, Colo.	1							.07						1,000

*Per cent.

Coal and Industrial Stocks.

Am. Agr. Chem., U.S.	100	28½	27¾	27½		28	25	27		28½	27⅞	28¼	28	1,352
Am. Agr. Chem. pf, U.S.	100	86⅝		86		87¼	86	88				86		400
Am. Car & Fdy., U.S.	100	31½	31	31¼	30½	30½	29¾	30¼	29	30⅝	30¼	30⅞		10,825
Am. Car & Fdy. pf, U.S.	100	91	90¼	91	90	89⅝	89	89½	88¾	90	89	90¼	90	2,915
Am. Sm. & Ref., U.S.	100	44⅛	43⅝	45¼	44	44¼	43¾	44¾	44	46¼	44⅜	46		20,850
Am. Sm. & Ref. pf, U.S.	100	96	95¼	95⅝		85⅜		95⅛	95	95¾	95⅛	95⅛	95¼	6,080
Col. Fuel & I., Colo.	100	108½	105½	106	102¾	103	99⅛	103	100⅛	104⅛	101¾	104¼	102	133710
Col. & H. C. & I., Colo.	100	20¼	20	20	19½	19⅛	18¼	19⅛	18⅛	19¼	18⅜	19⅛	18¼	8,200
Int'l S. Pump, U.S.	100	56	54½	55	54	53½		53		56	54	56	54	1,300
Int'l S. Pump pf, U.S.	100	94	91			90⅛		91		92	89	92	88	200
Mong. R. Coal, Pa.	100	13		13		13		13		13⅜				2,880
Mong. R. Coal pf, Pa.	100	43		42¾		42⅝		42¾		42¾	42⅛	42⅛	42¼	1,278
National Lead, U.S.	100	20¼	19⅛	20	18⅛	19½	18¼	19	18¼	19⅛	19	19¼	18⅝	6,365
National Lead pf, U.S.	100			88								89		265
National Salt, U.S.	100	20		20		20				20		20		
National Salt pf, U.S.	100	69¾		69¾		60¾				69¾		69¾		
Pittsburg Coal, Pa.	100	25	24⅞			24⅞		24¾	24½			24⅞	24⅝	1,038
Pittsburg Coal pf, Pa.	100	90½	90			90	89¾	90	89	89⅝		90	89¼	512
*Pressed Steel Car, Pa.	100	45⅞	45¼	45⅞	44⅓	44⅓	44½	45⅜	44⅛	46	45¼	†45	44⅜	1,500
Republic I & S., U.S.	100	19⅛	19	19⅝	18¾	18¼	17⅞	18	17¾	18¾	18	18⅞	18⅜	1,600
Republic I. & S., pf, U.S.	100	75¼	74⅛	74½	74	74¼	73½	73⅝	72⅞	74⅞	73⅛	74⅜	74	5,650
Sloss-Sheff S. & I., Ala.	100			30⅝	30½	33	30½	33	30	32	30	32	30	400
Sloss-Sheff S. & I. pf, Ala.	100	82½	82			82	80	82¼	81	82½	81	82½	80	
Standard Oil, U.S.	100	645	636	640	636	635		637		638	635	639	636	106
Tenn. C. I. & R. R., Ala.	100	71¼	70	70¼	66¼	68¾	67	68¾	65½	69¼	72⅛	68⅛	66	16,800
U. S. Red. & Ref., Colo.	100	43⅜		42⅜		43		41¾		43½		43½	64	900
U.S. Red. & Ref. pf, Colo	100	64½				64¾				63½		65¼	64	800
U.S. Steel Corp., U.S.	100	42⅛	41⅜	42	41	41⅜	40¾	41⅝	40⅞	41⅝	41	41⅞	41¼	134196
U.S. Steel Corp. pf, U.S.	100	92⅜	91¾	92¼	91⅜	91¼	90½	91⅜	91	92⅛	91⅜	92¾	91½	75,096
Va.-Car Chem., U.S.	100	75¼	74	75	72½	72½	71¾	73	71⅜	73½	72¾	73⅝	72½	19,350
Va.-Car Chem. pf, U.S.	100	132⅜	131½	131½	131¼							131⅛		1,200

Total sales, 656,576 shares. * Ex-dividend.

PHILADELPHIA, PA. §

Name and Location of Company.	par val	May 1. H.	May 1. L.	May 2. H.	May 2. L.	May 3. H.	May 3. L.	May 5. H.	May 5. L.	May 6. H.	May 6. L.	May 7. H.	May 7. L.	Sales
Am. Alkali	$50	1.18	1.06	1.00	.75									3,335
Am. Cement	10	7.13		7.25				7.00		7.00		7.13		1,190
Beth. Iron, Pa.	50													
Beth. Steel, Pa.	50													
Cambria Iron, Pa.	50	48.00	47.88					48.00				48.00		412
Cambria Steel, Pa.	50	24.88	24.63	24.75	24.50	24.50	24.38	24.50	24.25	24.63	24.25	24.75	24.38	7,125
Susq. I. & S., Pa.	10													
United Gas I., Pa.	50	121¾	121¼	122		121¾	122	121	121	120	121	120½	121	120¼	4,118

§Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 16,180 shares.

MEXICO.

Apr. 19.

Name of Company	Shares.	Last div'd	Prices. Bid.	Prices. Ask.	Name of Company.	Shares.	Last div'd	Price. Bid.	Price. Ask.
Durango:					Mexico:				
Ca. Min. de Penoles	2,500	$50.00	$4,150	$4,250	Alacran	2,400		$50	$65
Augustias, Pozos	2,400	5.00	50	65	La Esperanza (El Oro)	3,000	$10.00	795	895
Guananjuato:					Socovon de S. Fern.	2,500		20	30
Cinco Senores y An., aviada	2,000	15.00	245	255	Michoacan:				
Cinco Senores y An., aviada	400	10.00	215	225	Luz de Borda, avidador	3,000		20	32
Providencia, San Juan de la Luz	6,000	2.00	250	260	Luz de Borda, aviada	1,000		10	12
Guerrero:					San Luis Potosi:				
Garduno y Anexas.	7,200		30	50	Concepcion y An.	3,000		100	115
Hidalgo:					El Barreno, aviador.	2,000	2.00	20	22
Amistad y Concordia.	9,600	3.74	54	54¼	Sta. Maria de la Pa.	2,400	10.00	570	580
Carmen, aviada	1,100		250	300	Santa Fe.	2,400		20	30
Ca. Real del Monte	2,554		450	550	San Diego y Annexas.	2,400	4.00	70	80
El Encino, aviador	1,120		40	50	Zacatecas:				
Guadalupe Fresnillo y Annexas.	1,000		220	300	Candelaria y Pinos	2,500		320	340
La Blanca, aviada	1,536		490	500	San Carlos y Annexas	2,500	10.00	310	320
La Blanco, aviada	708		260	280	Sta. Maria de Gaud.	2,500	10.00	345	355
Maravillas y An., aviador	1,680		300	250	Miscellaneous:				
Maravillas el Lobo	1,000		200	250	Bartolome de Medina	2,000	1.50	50	55
Palma y An., aviador	1,800		15	25	Guadalupe Hacienda	10,000	4.00	220	230
Sta. Gertrudis y An., aviador	9,600		10	11	La Luz Hac. (Pachuca)	3,750		65	77
Sta. Gertrudis y An., aviador	28,800	0.50	65	65½	La Reina (Chihuahua)	192		2,500	3,500
Santo Tomas Apostol aviador	5,100		6	7	Naica (Chihuahua)	100		4,500	5,000
San Rafael y An., aviada	1,200	12.00	660	670	Natividad (Oaxaca) aviador	1,800	4.00	480	520
San Rafael y An., aviada	1,200	8.00	290	300	National (Oaxaca) aviador	1,800	4.00	400	500
Soledad, aviada	960	5.00	270	280	San Francisco Hac.	6,000	2.00	190	195
Sorpresa, aviada	900	5.00	180	185	Santa Ana Huantla Morelos	4,000		50	70
					Union Hacienda	3,000	5.00	180	195

BOSTON, MASS.

Name of Company.	par val	Shares listed.	May 1. H.	May 1. L.	May 2. H.	May 2. L.	May 3. H.	May 3. L.	May 5. H.	May 5. L.	May 6. H.	May 6. L.	May 7. H.	May 7. L.	Sales.
Adventure Con., c.	$25	100,000			22.00	21.50	22.00	21.75	22.00	21.75	24.00	23.00	23.75	23.00	1,350
Aetna Cons.	5	100,000													
Allouez, c.	25	80,000	3.50		3.50					3.50			3.75		625
Amalgamated, c.	100	1,500,000	66.13	65.50	66.50	65.00	65.75	65.25	65.88	65.00	67.50	66.00	68.50	66.50	8,378
Am. Gold Dreg.	5	90,000													200
Am. Z. L. & Sm.	25	60,000									12.00	10.00	12.00		100
Anaconda, c.	25	1,200,000									27.50				1
Arcadian, c.	25	150,000	6.75	6.00	4.50	4.00	5.00	4.63	5.25	5.00	6.00	5.25	6.50	6.00	4,700
Arnold, c.	25	60,000			.75										100
Atlantic, c.	25	40,000	30.00		28.00				30.00		33.50	30.00	34.00	33.00	1,700
Baltic	25	100,000													
Bingham, Cons.	50	150,000	35.50	35.13	35.38	35.00	35.00	34.25	36.00	35.00	38.00	33.25	38.50	37.00	6,784
Bonanza Dev.	10	300,000			.80						.75				355
Boston, q.	10	100,000													
British Columbia	5	250,000													
Cal. & Hecla, c.	25	100,000	536.	535.	540.		545.	535.	540.	530.	545.	542.	545.	542½	238
Centennial, c.	25	90,000	19.63	19.38	19.25	17.63	18.00	17.50	17.50	19.75	20.00	17.88	20.00	19.50	4,465
Central Oil	25	60,050	8 88	8.63	9.00	8.50	8.75	8.50	8.25		8.75	8.50	8.88	8.50	1,070
Cochiti, g.	10	182,250													
Cons. Mercur, g.	5	1,000,000	1.38		1.88		1.88		1.88		1.88				2,543
Con. Zinc & L. M. S.	10	110,000			3.00								3.00		130
Copper Range, Con.	100	285,000	58.50	57.00	57.50	53.50	55.75	54.00	56.00	54.38	60.00	56.00	60.50	58.63	43,949
Daly-West	20	150,000	45.00		45.00	44.50	45 50		45.75		46 50	46.00	46.00	44.75	395
Dominion Coal	100	150,000			141.	135	137½	130.	139.	137½	137.		138½	138	2,422
Dominion Coal, pf.	100	30,000			116.								116.		13
Dominion I & S.	100	100,000	68 88	68.00	68.75	65.00	66.25	62.00	65.00	64.25	64.00	62.50	61 50	61.00	8,910
Elm River, c.	12	100,000			3.00								3.50	3.25	283
Franklin, c.	25	100,000	11.50		11.00		11.00	10.75	11.50	11.00	12.00	11.00			1,214
Guanajuato Cons.	5	385,000			4.00	3.50	3.38	3.25	3.50	3.25			3.50		1,520
Humboldt, c.	25	40,000													
I. Royale Con., c.	25	150,000	15.00	14.50	14.63	14.00			14.00	13.50	13.75	13.50	14.75	14.25	980
Mass. Con., c.	25	100,000	17.75	17.50	17.75	17.00	17.38	17.00	17.50	17.00	19.25	17.50	19.25	18.75	7,238
Mayflower, c.	25	100,000					2.50						2.75		215
Merced	15	100,000													
Michigan, c.	25	100,000	10.00		10.25	9.25			9.25		10.75	9.88	10.75	10.50	1,620
Mohawk, c.	25	100,000	35.50	35.13	35.75	34.00	35.25	34.25	35.50	34.50	36.00	34.50	37.75	36.00	2,052
Mont. C. & C.	25	200,000			4.00				4.50	4.00	4.00				1,950
Mont'l & Boston	5	570,000	3.25		3.50	3.00	3.25	3.00	3.13	3.00	3.00	2.88	2.88		3,310
National	25	100,000											1.03		15
N. E. Gas & Coke	25	100,000			3.50				3.25		4.13		4.00		35
New Idria	5	100,000													
Old Colony, c.	25	100,000			3.50				3.25				3.50		535
Old Dominion, c.	25	150,000	18.13				17.50		18.00	17.75	19.00		20.00		515
Osceola, c.	25	96,150	62.25		62.50	62.00	63.00	62.00	61.00		61.25	61.00	62.50	62.00	974
Parrot, s. c.	10	229,850	25.00	24.75	25.25	25.00	25.00				26 50	25.50	26.50	26.00	428
Phoenix Con., c.	25	100,000	3.50								4.75		4.75		365
Quincy, c.	25	100,000	1.25		1.25				125.		125		125.		561
Rhode Island, c.	25	100,000			2.25				2.25				2.25		335
Santa Fe, g. c.	10	250,000					2.75								600
Santa Ysabel	5	130,000													
Tamarack, c.	25	60,000	175		175.	170.	171		172.	170.	170.		170.		530
Tecumseh, c.	25	80,000	1.50	1.25											10
Tennessee	25	175,000													
Trimountain, c.	25	100,000	1.50												175
Trinity, c.	25	160,000	13.00	12.75	12 88	12.25	12.50	12.13	12.50	12.13	13.75	12.13	13.38	12 25	7,059
United States, g.	25	250,000	21.25	21.00	20.88	20.25	21.00	20.60	20.25	20.00	21.50	20.38	21 50	21 38	9,296
U. S. Oil	25	100,000	15.50	15.00	15.25	14.75	15 25	14 75	17.75	16.00	18.13	17.50	17.50	16.75	21,248
Utah Con., g.	5	300,000	23.00	22.38	22.50	22.00	22.25	22.00	22.50	22.00	23.00	22.00	23.00	22.00	1,936
Victoria, g.	25	100,000	4.75	4.50	4.50	4.25	4.31		4.50	4.13	4.50		4.75	4.50	1,480
Washington, c.	25	60,000													
Winona, c.	25	100,000	2.00		2.00	1.75	1.75		2.00		2.00				460
Wolverine, c.	25	60,000	54.00	53.50	54.00		54.00	53.00	54.00		54 75	54.00	56.00	55.00	566
Wyandot, c.	25	100 000	1.13				1.00								600

Official Quotations Boston Stock Exchange. Total sales, 163,273 shares. †Ex-dividend

ST. LOUIS, MO.*

May 5.

Name.	Shares.	Par	Bid.	Ask.	Name.	Shares.	Par	Bid.	Ask.
Adams.	1,500,000	$10	$0 25	$0.50	Con. Coal, Ill.	50,000	$100	$19.00	$20.00
Am.-Nettie, Colo.	300,000	10	.90	1.00	Doe Run Lead Co.	10,000	100	128.00	135.00
Catherine Lead, Mo.	50,000	10	3.00	4.00	Granite Bimet, Mt.	1,000,000	10	2.37	2.60
Central Lead, Mo.	10,000	100	130.00	135.00	St. Joe Lead, Mo.	300,000	10	17.00	18.00
Columbia Lead, Mo.	50,000	10	13.00	14.00					

*From our Special Correspondent.

SPOKANE, WASH.*

May 2.

Name of Company.	Par Val.	H.	L.	Sales.	Name of Company.	Par Val.	H.	L.	Sales.
American Boy	$1	.07	.05¼	9,000	Princess Maud	$1	03½	.03⅓	20,000
Black Tail	1	.14	.12⅜	8,000	Quilp	1	39	.36	
Ben Hur	1	.15	.13⅓		Rambler Cariboo	1	.89	.88	
Fisher Maiden	1	.09	.07	2,000	Republic	1	.10⅜	.10⅛	2,000
Gold Ledge	0.05	.01¾	01⅝	8,000	San Poil	1	.30	.28½	
Lone Pine-Surp. Con.	1	07⅛	.06⅞	7,500	Sullivan	1	.09⅓	.08⅜	13,500
Morning Glory	1	.03¼	.03⅛	9,000	Tom Thumb	1	.23	.22½	7,000
Mountain Lion	0.10	.28	.27¾		Trade Dollar	1	.15	.12½	1,000

Total sales 87,000 shares. *Reported by Hunner & Harris.

SALT LAKE CITY.*

May 3.

Name of Company.	Location.	Shares.	Par Val.	Quotations. High.	Quotations. Low.	Sales.
Ajax	Tintic	300,000	$10	$0.46½	$0.41½	31,700
Anchor	Park City	150,000	10	3.40	3.40	700
Bullion Beck	Tintic	100,000	10			
Carisa.	Tintic	500,000	1	.41	.35	79,200
Con. Mercur	Mercur	1,000,000	5	1.88	1.79	2,000
Creole	Park City	150,000	1			
Daly	Park City	150,000	20			
Daly-West	Park City	150,000	20	45.65	43.50	1,124
Dexter	Tuscarora	200,000	5			
Eagle & B. Bell	Tintic	250,000	1	.86	.87	100
Grand Central	Tintic	250,000	1			
Horn Silver	Frisco	400,000	25			
L. Mammoth	Tintic	150,000	1	1.62	1.46	6,200
Mammoth	Tintic	400,000	25	1.30	1.23	2,800
May Day	Tintic	400,000	.25	.32⅜	.29⅛	116,000
Ontario	Park City	150,000	100	8 50	8.50	100
Sacramento	Mercur	1,000,000	5	.21	.20	5,200
Silver King	Park City	150,000	20			
Star Con.	Tintic	500,000	1	.24½	.15½	45,300
Swansea	Tintic	100,000	5	1.75	1.75	500
So. Swansea	Tintic	300,000	1	.79	.60	35,686
Showers Con.	Tintic	400,000	5	.05	.05	1,000
Sunshine	Mercur	250,000	10	.20	.20	200
Tetro	Tintic	500,000	5	.21	.18½	1,800
Tesora	Tintic	400,000	1	.08	.08	500
U. Sunbeam	Tintic	150,000	1	.33	.32¾	4,200
Uncle Sam	Tintic	500,000	1	.37¼	.30	66,700
West Mng. Glory	Tintic	500,000	.10	.02	.02	1,640
Victor	Tintic	500,000	1	.22	.20	6,700
Yankee Con.	Tintic	500,000	1	2.35	2.05	9,200
Ben Butler	Bingham	500,000	1	.12¾	.11¾	5,500
Boss Tweed	Tintic	250,000	1			
California	Park City	300,000	1	.18¼	.09⅛	88,800
Century	Park Valley	150,000	1	.68	.52	21,400

*By our Special Correspondent. Total number of shares sold, 533,650.

STOCK QUOTATIONS.

COLORADO SPRINGS, COLO.

Name of Company.	par val	Apr. 28. H.	Apr. 28. L.	Apr. 29. H.	Apr. 29. L.	Apr. 30. H.	Apr. 30. L.	May 1. H.	May 1. L.	May 2. H.	May 2. L.	May 3. H.	May 3. L.	Sales
Acacia	$1	.09	.....	.09	.07	.09	.....	.09	.....	.09	.05	.09	.05	100
Alamo	1	.03⅝	.03¼	.03⅜	.03¼	.03¾	.03¼	.03½	.03¼	.03½	.03¼	.03½	.03¾	6,500
Am. Con	1	.02¼	.....	.02	.....	.02	.....	.02	.....	.02	.....	.02	.....	.....
Anaconda	1	.18	.17	.18	.....	.17½	.....	.17	.....	.17	.10	.17	.....	1,000
Aola	1	.01⅛	.....	.01⅛	.01¼	.01½	.01¼	.01¼	.01¼	.01⅛	.01¼	.01	.....	1,600
Argentum Jr	1	.04	.....	.03	.....	.03½	.....	.02⅞	.....	.02½	.....	.02½	.....	1,000
Battle Mt. C	1	.17	.14	.....	.....	.14¾	.....	.17	.13	.14½	.....	.14½	.....	3,000
Ben Hur	1	.04⅛	.04	.04⅛	.04	.04⅛	.04¼	.04⅛	.04¼	.04¼	.....	.04⅛	.04¼	2,000
Black Bell	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Blue Bell	1	.07	.....	.06½	.....	.06½	.....	.07	.....	.07	.04	.07	.04	.....
Buckhorn	1	.02¼	.....	.02⅛	.01½	.02⅛	.01½	.02⅛	.01¾	.01⅞	.....	.01⅞	.01½	.....
But'fly Ter	1	.21	.19	.21	.20	.19	.....	.21	.19	.19¾	.19¼	.21	.19	4,000
Cent'l Con	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Champion	1	.02⅛	.02	.02⅛	.02	.02⅛	.02	.02⅛	.....	.02½	.....	.02⅜	.....	3,000
C. K. & N	1	.06¾	.06⅜	.06½	.06⅜	.06⅝	.06½	.06¾	.06⅝	.07⅜	.07	.06⅞	.06⅞	93,000
Columbine-Victor	1	.07⅛	.07	.07⅛	.07⅛	.07¼	.07⅛	.07⅛	.07	.07¼	.07	.07⅛	.06⅞	24,000
C. C. G. Ext	1	.05	.04½	.05	.04¾	.05	.04½	.04½	.....	.05	.04⅝	.05	.04½	.....
C. C. & Mn	1	.02¾	.02⅝	.02¾	.02⅝	.02⅞	.02⅝	.02⅞	.02⅛	.02¼	.02⅝	.....	.....	.....
Cr'de & C. C	1	.03	.....	.04	.03½	.04	.03½	.03½	.....	.04	.03¼	.04	.03⅜	.....
C. C. Con	1	.06⅜	.06¼	.06¼	.06⅜	.06¼	.06	.06¼	.06⅛	.06⅜	.06⅜	.06½	.06	10,000
Dante	1	.04⅜	.03⅝	.04	.03⅝	.03⅜	.03⅝	.04	.03¾	.03¾	.03¼	.03⅜	.03¼	3,000
Dr. Jack Pot	1	.36	.35¾	.35	.34¼	.34	.....	.34	.33	.30	.28¾	.30	.23	21,300
Echo	1	.01½	.....	.01¼	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,000
Elkton, Con	1	.68¼	.68	.65½	.55	.63	.62⅜	.64	.63⅞	.62½	.62¼	.60	.....	81,400
El Paso, G	1	.46	.45⅜	.45	.44¾	.45	.43¾	.43⅜	.42½	.43⅜	.42⅝	.46	.45⅝	23,650
Fanny Rawlings	1	.05	.04	.05	.04	.05	.04	.05	.04	.05	.04	.04¾	.04	1,000
Findley	1	.09½	.09¾	.09⅝	.09⅜	.09⅜	.....	.09¾	.09⅜	.09⅝	.09⅜	.09⅜	.09¼	6,000
Gold Dollar	1	.03½	.03¼	.03½	.03	.03¼	.02¾	.02	.....	.02	.....	.03	.02	6,000
Gold Dollar Con	1	.12	.....	.12	.....	.....	.....	.07½	.06¾	.06⅝	.06⅜	.....	.....	3,000
Gold Cycle	1	.61½	.60	.60¼	.59	.60	.59	.60¼	.58	.59	.....	.59	.....	1,000
Gold Fleece	1	.28	.22	.27	.20	.27	.....	.26	.20	.28	.20	.25	.20	500
Gold Knob	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,000
Gold Sov'n	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,000
Hart	1	.04	.03⅝	.04	.....	.04	.....	.04	.....	.04	.....	.04	.....	2,000
Ida May	⅛	.08	.....	.08	.....	.08	.....	.08	.....	.15	.08	.....	.....	.....
Ironclad	1	.03	.02¾	.02½	.....	.02⅝	.02¾	.02⅝	.....	.02¾	.....	.02⅜	.....	.....
Isabella	1	.24	.23½	.23¼	.23½	.24	.23½	.23¼	.23	.23¼	.23	.23	.....	18,550
Jack Pot	1	.25	.23½	.25	.23	.25	.23	.24	.20	.24	.18	.22½	.15	2,500
Last Dollar	1	.52½	.47	.45	.....	.45	.....	.55	.....	.52	.45	.60	.50	500
Lexington	1	.06¾	.06	.06⅛	.06	.06⅛	.06	.06⅛	.06	.06⅛	.06	.06⅛	.06⅛	15,000
Little Nell	1	.02¾	.....	.02	.....	.02½	.02	.02⅞	.....	.....	.....	.....	.....	15,000
Little Puck	1	.06	.05¾	.06	.05	.05½	.05	.05½	.05	.04⅝	.....	.05	.04½	6,000
Matoa	1	.07	.....	.07	.....	.07	.....	.07	.....	.07	.....	.07	.....	.....
Midway	1	.03⅛	.03¼	.03¼	.03¼	.03⅜	.....	.03¼	.....	.03¼	.03	.03½	.02⅞	5,000
Mint	1	.04¾	.04	.04½	.03½	.05	.04	.05	.04	.04	.....	.04½	.04¼	5,250
Missouri	1	.02	.....	.02	.....	.02½	.....	.02⅝	.....	.02	.....	.....	.....	1,000
Mobile	1	.01¾	.01¾	.01⅝	.01	.01⅞	.01	.01⅞	.....	.01½	.....	.02	.....	6,000
Moll Dwyer	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7,000
Mol. Gibson	1	.12	.11½	.11½	.11	.11⅜	.10¾	.11¾	.10¾	.11¼	.10¾	.11¼	.10½	2,000
Monarch	1	.02	.01½	.02	.....	.02	.....	.01¾	.....	.01¾	.....	.....	.....	4,000
Montreal	1	.....	.....	.....	.....	.....	.....	.01¼	.....	.....	.....	.....	.....	.....
Moon A'c'r	1	.15	.....	.15	.....	.15	.....	.15	.....	.12½	.....	.10	.....	1,000
Morn'g Star	1	.01¾	.01½	.01¾	.01½	.01¾	.01½	.01¾	.01½	.01⅝	.01⅝	.02	.....	14,500
National	1	.01⅝	.01¼	.02	.01¾	.0⅝	.01¼	.01⅝	.....	.....	.....	.02	.....	1,000
Nellie, V	1	.02	.....	.02	.01¾	.02	.01½	.02	.01½	.02	.01½	.02	.....	12,000
New Haven	1	.02⅝	.02⅜	.02⅝	.02⅜	.02⅜	.02⅝	.02⅞	.02½	.02¾	.02⅜	.02⅜	.02⅜	1,000
Olive Branch	1	.....	.....	.01¼	.01	.01¼	.01	.....	.....	.....	.....	.....	.....	.....
Oriole	1	.01⅜	.....	.01⅜	.....	.01⅜	.....	.01⅜	.....	.01½	.....	.02	.....	.....
Pappoose	1	.02	.....	.02	.....	.02	.....	.02	.....	.02	.....	.02	.....	.....
Pharmacist	1	.04	.....	.04	.....	.03⅜	.03	.03⅜	.03	.03	.....	.04	.03	.....
Pilgrim	1	.04⅜	.04	.04⅜	.04	.04⅜	.04	.04⅜	.04	.....	.....	.....	.....	.....
Pinnacle	1	.05½	.....	.....	.....	.06	.....	.06½	.05½	.06½	.05½	.06½	.05	.....
Pointer	1	.02⅜	.02⅜	.02⅜	.02¼	.02½	.02¼	.02⅜	.02¼	.02⅜	.02¼	.03½	.02	3,000
Portland	1	1.83	1.81½	1.85	1.80	1.83	1.80½	1.83	1.80	1.76	1.75	1.80	1.75	8,400
Prince Alb	1	.02½	.02	.02⅞	.02⅜	.02	.....	.02½	.02¼	.02½	.02	.02½	.02¼	1,000
Princess	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Progress	1	.04⅜	.04	.04½	.03¾	.04⅜	.03½	.04¼	.03½	.04	.03	.04	.02¾	2,100
Pythias	1	.01⅜	.....	.05	.02	.02	.....	.01⅜	.....	.02	.....	.02	.....	.....
Republic	1	.02½	.01⅝	.01½	.....	.01½	.....	.02⅛	.01½	.02½	.01⅝	.02½	.01½	.....
Rob. Burns	1	.02	.01½	.02	.01½	.01	.....	.02¼	.....	.02⅛	.01⅝	.02	.....	1,000
Rose Maud	1	.03⅜	.02¾	.03⅜	.02½	.03½	.03	.03	.02½	.03	.....	.02¾	.02½	5,000
Rose Nicol	1	.04	.03½	.04	.02	.....	.....	.....	.....	.03¾	.03½	.....	.....	2,100
Sunset Eclipse	1	.06	.05¾	.04½	.03⅞	.04⅛	.04¼	.04	.03⅞	.04¼	.03⅞	.04⅛	.03¾	38,100
Uncle Sam	1	.02	.01	.02	.01	.01	.....	.02	.01⅜	.01	.....	.....	.....	.....
Union	1	.03	.01	.03	.01	.03	.01	.03	.01	.03	.01	.....	.....	.....
Vindicator	1	1.00	.94	.90	.....	.95	.92	.95	.94¾	.96	.91	.....	.....	2,600
Va. M	1	.03¼	.01	.03½	.01	.03½	.01	.01	.....	.01¾	.....	.....	.....	.....
Work	1	.06¾	.06	.06¾	.05¾	.06	.05½	.05¾	.05¾	.05	.04½	.05	.04¾	31,000

Total sales 521,150 shares.

Colorado Springs (*By Telegraph.*)

Name of Company.	par val	May 1. H.	May 1. L.	May 2. H.	May 2. L.	May 3. H.	May 3. L.	May 5. H.	May 5. L.	May 6. H.	May 6. L.	May 7. H.	May 7. L.
Acacia	$1	.09	.08	.09	.65	.09	.05	.09	.05	.09	.07	.08½	.06½
Alamo	1	.03½	.03¼	.03½	.03¼	.03½	.03¼	.03⅜	.03¼	.03⅜	.03¼	.03⅜	.03¼
Anaconda	1	.17	.16	.17	.10	.17	.13	.17	.13	.17	.12	.18	.17
Argentum	1	.02⅛	.02	.02⅛	.02	.02½	.02	.02¼	.02	.02½	.02	.02½	.02
Battle Mt	1	.17	.13	.14½	.13¾	.14⅜	.12	.14¾	.12½	.17	.13	.14⅜	.11¾
Butterfly Ter	1	.21	.19	.19¾	.19¼	.21	.19	.19⅜	.18⅝	.19⅜	.17	.20	.18¾
Cripple Creek Con	1	.06¾	.06⅜	.06⅝	.06⅜	.06½	.06	.06¼	.06⅜	.06¾	.06⅜	.06¼	.06⅜
Dr. Jack Pot	1	.34	.30	.30	.28¾	.30	.28	.30	.29	.30	.29¾	.31	.29½
El Paso	1	.43¾	.42½	.43⅜	.42⅝	.46	.45½	.46½	.46	.44⅝	.44⅛	.50½	.50
Elkton, Con	1	.64	.63¾	.62⅞	.62¾	.60½	.60	.58	.57	.62	.62⅛	.66	.65
Fanny Rawlings	1	.05	.04	.05	.04	.04¾	.04	.04½	.04	.05	.04	.05	.04
Findlay	1	.09¾	.09⅜	.09⅝	.09⅜	.09¾	.09¼	.09¼	.09⅛	.09⅜	.09	.09½	.09
Gold Dollar Cons	1	.07½	.06¾	.06⅞	.06⅝	.06⅝	.06⅜	.06⅝	.06	.06¾	.06	.07⅛	.06
Gold Soy'n	1	.02½	.02¼	.02⅝	.02½	.03	.02½	.02¾	.02⅛	.02¾	.02⅛	.02⅝	.02¼
Golden Cycle	1	.60½	.58	.60⅛	.50	.60	.59	.60⅛	.59	.61	.59	.65	.59
Golden Fleece	1	.26	.20	.28	.20	.25	.20	.24	.22	.25	.20	.25	.20
Hart	1	.04	.03	.04	.03	.04	.03	.04	.03	.04	.03	.04	.03
Isabella	1	.23¼	.23	.23½	.23	.23¼	.23	.23½	.23	.23¼	.23	.24⅛	.24
Jack Pot	1	.24	.20	.24	.18	.22½	.15	.22	.18	.20¼	.19¼	.22	.18
Keystone	1	.04	.03¼	.04	.03	.04	.03	.04	.03½	.04	.03⅛	.04	.03¼
Last Dollar	1	.55	.47½	.52	.45	.60	.50	.55	.48	.60	.48	.55	.46
Lexington	1	.06½	.06	.06⅜	.06	.06⅜	.06¼	.06¾	.06	.06⅜	.06	.06	.05¾
Mollie Gibson	1	.11¾	.10¾	.11¼	.10¾	.11¾	.10½	.11⅜	.10½	.10¾	.10⅜	.12	.11
Moon Anchor	1	.15	.13	.12½	.11	.12½	.10	.14	.12	.13	.10	.15	.12
National	1	.01¾	.01¼	.01½	.01¼	.01½	.01¼	.01⅛	.01⅜	.01¼	.01	.01¼	.01
New Haven	1	.02⅞	.02⅛	.02⅜	.02⅜	.02⅜	.02⅜	.02⅞	.02½	.03⅜	.02¾	.03¼	.02¾
Pharmacist	1	.03½	.03	.03⅜	.03	.04	.03	.04	.03¼	.04	.03	.04	.03
Pinnacle	1	.06¾	.05½	.06⅛	.05½	.06⅛	.05	.06	.05½	.06¼	.06	.06⅛	.06
Portland	1	1.83	1.80	1.76	1.75	1.80	1.75	1.82	1.76¾	1.78½	1.77	1.90	1.82½
Sunset Eclipse	1	.04½	.03¾	.04¼	.03⅞	.04⅜	.03¾	.03¾	.03⅜	.....	.....	.03¾	.03
Vindicator, Con	1	.95	.94¾	.96	.81	.96	.94	.96	.93	.96	.90	.95	.92
Work	1	.05¾	.05½	.05	.04½	.05	.04¾	.05¼	.04¾	.06	.05	.05¾	.05⅝

MONTREAL, CANADA. May 5.

Name of Company.	par val	H.	L.	Sales	Nome of Company.	par val	H.	L.	Sales
Big Three	$1	.01¼	.....	.....	Montreal-London	$0.24	.02¼	.....	.....
California	1	.04½	.04	.....	Noble Five	1	.....	.....	.....
Can. Gold Fields	0.10	.....	.....	.....	Novelty	1	.....	.....	.....
Deer Trail Con	1	.03½	.02¼	.....	North Star	.....	.23	.....	1,000
Evening Star	1	.04	.02	.....	Payne	1	.29	.....	50
Golden Star	1	.04¼	.03	.....	Rambler-Cariboo	1	.....	.....	.....
Gold Hills Dev	1	.01½	.....	.....	Republic Con	1	.10	.....	.....
Knob Hill	1	.....	.....	.....	Slocan-Sovereign	1	.02¼	.....	.....
Monte Christo	1	.02	.....	.....	Virtue	1	.12	.....	1,000
Montreal, G. F	1	.02½	.....	.....	War Eagle	1	.28	.27	3,000

LONDON. Apr. 26.

Name and Country of Company	Authorized Capital.	Par value.	Last dividend. Amt.	Last dividend. Date	Quotations. Buyers.	Quotations. Sellers.
	£	£. s. d.	s. d.		£. s. d.	£. s. d.
Anaconda, c. s., Montana	6,000,000	5 0 0	2 0	May, 1902	5 16 3	5 18 9
Copiapo, c., Chile	200,000	2 0 0	2 6	Dec., 1901	2 5 0	2 10 0
De Lamar, g. s., Idaho	400,000	1 0 0	2 0	Dec., 1901	15 0	1 0 0
Enterprise, g., British Col	200,000	1 0 0			7 6	12 6
Frontino & Bolivia, g., Columbia	140,000	1 0 0	3 0	July, 1901	1 1 3	1 3 9
Hall Mg. & Sm., c. s., British Col	325,000	1 0 0			1 6	2 6
Le Roi, g., British Col	1,000,000	5 0 0	5 0	Nov., 1899	3 2 6	3 7 6
Le Roi No. 2, g., British Col	120,000	5 0 0	5 0	May, 1902	5 5 0	5 7 6
Montana, g. s., Montana	660,000	1 0 0	6	April, 1899	3 9	4 5
Mountain Copper, California	1,250,000	5 0 0	4	Oct., 1901	4 2 6	4 7 6
Stratton's Independence, Colorado	1,100,000	1 0 0	1 0	Jan., 1902	6 3	12 6
St. John del Rev., g., Brazil	600,000	1 0 0	1 0	June, 1901	17 6	18 6
Utah Con., g., (High. Boy), Utah	300,000	1 0 0	5 0	May, 1901	4 5 0	4 15 0
Ymir, g., British Col	200,000	1 0 0	1 0	Mar., 1902	1 8 9	1 11 3
European:						
Linares, l., Spain	45,000	3 0 0	7 0	March, 1901	3 0 0	4 0 0
Mason & Barry, c., sul., Port'g'l	420,000	1 0 0	13 0	May, 1902	4 0 0	4 5 0
Rio Tinto, c., Spain	1,625,000	5 0 0	37s 6d	April, 1902	43 15 0	44 0 0
Rio Tinto, pref., Spain	1,625,000	5 0 0	2s 6d	April, 1902	6 2 6	6 5 0
Tharsis, c., Spain	1,250,000	2 0 0	12 0	April, 1902	4 15 0	5 5 0
Australia and New Zealand:						
Assoc. Gold Mines, W. Australia	500,000	1 0 0	1 6	Jan., 1900	1 5 0	1 7 6
Br'ken Hill Pr'p., s., N. S. Wales	384,000	8 0	1 0	Nov., 1901	1 10 6	1 11 6
Great Bo'd'r Pr'p., W. Australia	175,000	2 0	6	Jan., 1902	18 6	19 6
Hannan's Brownhill, g., W. Australia	140,000	1 0 0	7 6	Oct., 1900	2 13 9	2 15 0
Ivanhoe Gold C'p., W. Australia	1,000,000	5 0 0	3 0	Feb., 1902	6 15 0	6 17 6
Kalgurlie, g., W. Australia	120,000	1 0 0	rts.	Oct., 1899	3 8 9	3 11 3
Lake View Cons., g., W. Australia	250,000	1 0 0	5 0	Oct., 1901	2 13 9	2 16 3
Mt. Lyell M. E. R. L., c., Tasmania	600,000	3 0 0	4 0	Jan., 1902	3 10 0	3 12 6
Mt. Morgan, g., Queensland	1,000,000	1 0 0	3	Mar., 1902	4 0 0	4 2 6
Waihi, g., New Zealand	330,000	1 0 0	2 6	Mar., 1902	5 15 0	5 17 6
Indian:						
Champion Reef, g., Colar Fields	234,169	10 0	7 8	Jan., 1902	5 12 6	5 15 0
Mysore Gold, Colar Fields	265,000	10 0	5 0	Mar., 1902	6 8 9	6 11 3
Nundydroog, g., Colar Fields	242,000	10 0	1 6	Nov., 1901	1 13 9	1 16 3
Ooregum, g., Colar Fields	290,000	10 0	1 6	Dec., 1901	2 3 9	2 3 3
Ooregum, pref., g., Colar Fields	240,000	10 0	1 6	Dec., 1901	2 12 6	2 15 0
African:						
British S. Africa, chartered S. Africa	5,000,000	1 0 0	rts.	May, 1899	3 16 3	3 18 9
Cape Copper, S. Africa	600,000	2 0 0	8 0	Jan., 1902	4 2 6	4 5 0
Cape Copper, pref., S. Africa	150,000	2 0 0	8 0	Jan., 1902	3 15 0	4 0 0
City and Sub'n (New), g., Transvaal	1,360,000	4 0 0	3 0	Aug., 1899	7 10 0	7 12 6
Crown Reef, g., Transvaal	120,000	1 0 0	10 0	Apr., 1902	17 15 0	18 2 6
De Beers Con., d., pref., Cape Colony	.....	.....	.....	.....	19 8 9	19 11 3
De Beers Con., def.	.....	.....	.....	.....	24 0 0	24 2 6
Ferreria g., Transvaal	90,000	1 0 0	10 0	Jan., 1902	24 15 0	25 5 0
Geldenhuis Est., g. Transvaal	200,000	1 0 0	10 0	Aug., 1899	7 2 6	7 5 0
Henry Nourse, g., Transvaal	125,000	1 0 0	10 0	Aug., 1899	9 15 0	10 0 0
Jagersfontein, d., Orange F. S.	1,000,000	5 0 0	6 0	Dec., 1900	26 12 6	26 17 6
Joh'n'b'g Con. Invet., S. Africa	2,750,000	1 0 0	2 0	Nov., 1899	3 17 6	3 18 9
Jubilee, g., Transvaal	50,000	1 0 0	5 0	Aug., 1899	7 0 0	7 5 0
Langlaagte Est., g., Transvaal	470,000	1 0 0	3 0	Sept., 1899	4 7 6	4 10 0
May Con., g., Transvaal	230,000	1 0 0	0 6	Aug., 1899	4 18 9	5 1 3
Meyer & Charlton, g., Transvaal	100,000	1 0 0	3 0	Feb., 1902	5 17 6	6 2 6
Namaqua, c., Cape Colony	200,000	2 0 0	3 0	Feb., 1902	3 2 6	3 7 6
Primrose (New), g., Transvaal	300,000	1 0 0	6 0	Aug., 1899	4 18 9	5 1 3
Rand Mines, g., S. Africa	1,795,956	5 0	15 0	Aug., 1899	12 8 9	12 11 3
Robinson, g., Transvaal	2,750,000	5 0 0	8 0	Aug., 1899	11 3 9	11 6 3
Sheba, g., Taansvaal	1,100,000	1 0 0	5 0	Feb., 1902	1 7 6	1 8 9
Sim. & Jack (new) g., Transvaal	.....	1 0 0	.....	.....	2 2 6	2 5 0
Wolhuter, g., Transvaal	860,000	4 0 0	2 0	Feb., 1899	5 15 0	5 17 6

c.—Copper. d.—Diamonds. g.—Gold. l.—Lead. s.—Silver.

PARIS. Apr. 17.

Name of Company.	Country.	Product.	Capital Stock.	Par value.	Latest divs.	Prices. Opening.	Prices. Closing.
			Francs.	Fr.	Fr.	Fr.	Fr.
Acieries de Creusot	France	Steel mfrs	27,000,000	2,000	85.00	1,715.00	1,720.00
" " Firminy	"	" "	3,000,000	500	200.00	2,720.00	2,720.00
" " Huta-Bank	Russia	Iron and Steel	.....	500	.....	3,200.00	3,360.00
" " la Marine	France	Steel mfrs	20,000,000	500	65.00	1,335.00	1,345.00
Anzin	"	Coal	.....	.....	320.00	5,405.00	5,355.00
Boleo	Lower Cal	Copper	.....	500	176.00	1,755.00	1,835.00
Briansk	Russia	Coal and Iron	.....	500	.....	404.00	395.00
Champ d'Or	S. Africa	Gold	3,375,000	25	3.75	33.50	33.50
Courrieres	France	Coal	600,000	300	90.00	2,305.00	2,310.00
Dombrowa	Russia	"	.....	500	75.00	981.00	980.00
Dourges	France	"	12,000,000	500	1,000	24,700.00	24,700.00
Dynamite Centrale	"	Explosives	.....	500	19.00	717.00	712.00
Escombrera-Bleyberg	Spain	Lead	.....	500	50.00	834.00	807.00
Fraser River	Brit. Col'mb	Gold	250,000	25	.....	7.00	7.00
Huanchaca	Bolivia	Silver	40,000,000	125	5.00	135.50	133.50
Laurium	Greece	Zinc and Lead	16,300,000	500	25.00	380.00	397.50
Malfidano	Italy	Zinc	12,500,000	500	12.50	375.00	384.00
Metaux, Cie. Fran. de	France	Metal dealers	25,000,000	500	22.50	460.00	465.00
Mokta-el-Hadid	Algeria	Iron	18,312,500	500	35.00	866.00	870.00
Napthe Baku	Russia	Petroleum	.....	.....	.....	474.50	459.50
Napthe Nobel	"	"	.....	.....	.....	540.00	540.00
" parts	"	"	.....	.....	.....	10,875.00	10,850.00
Nickel	N. Caled'nia	Nickel	10,000,000	250	20.00	530.00	540.00
Penarroya	Spain	Coal, etc	.....	500	55.00	1,010.00	1,015.00
Rebecca	Colo'do, U. S.	Gold	5,000,000	25	.....	2.00	2.00
Salines de l'Est	France	Salt	.....	500	6.00	275.00	287.00
Salines du Midi	"	"	.....	500	40.00	915.00	910.00
Vielle Montagne	Belgium	Zinc	9,000,000	30	30.00	555.00	550.00

TORONTO, ONT.

Name of Company.	par val	Apr. 29. H.	Apr. 29. L.	Apr. 30. H.	Apr. 30. L.	May 1. H.	May 1. L.	May 2. H.	May 2. L.	May 3. H.	May 3. L.	May 5. H.	May 5. L.	Sales
Ontario:														
Olive	1	.06	.04	.06	.05	.06	.04	.06	.04	.06	.04	.06	.04	.....
British Columbia:														
Cariboo McK	1	.28	.26	.28½	.24½	.24	.20	.24	.15	.24	.....	.20	.18	1,000
Center Star	1	.43	.41	.41	.39	.41	.35	.41	.35	.41	.39	.41	.37	.....
Deer Trail	1	.03	.02	.02¾	.02¼	.02¾	.02	.02¾	.02¼	.02½	.....	.02½	.....	.....
Fairview	1	.04¾	.04	.04¾	.04¼	.04¾	.04¼	.04½	.04¼	.04¾	.04¼	.04¾	.04¼	875
Lone Pine	1	.....	.....	.....	.....	.....	.....	.....	.....	.07¾	.07	.08	.07	.....
Morrison	1	.06	.03	.06	.....	.06	.....	.06	.....	.06	.....	.06	.....	.....
Mt. Lion	1	.32	.27	.33	.27	.30	.25	.31	.26	.30	.25	.30	.25	.....
North Star	1	.24	.22½	.23½	.22½	.24	.22	.24	.22½	.24	.22	.24	.21	1,500
Payne	1	.32	.29	.32	.29	.31	.28	.31	.28	.32	.27	.31	.25	.....
Rambler	1	.90	.85	.90	.85	.90	.80	.90	.80	.95	.85	.90	.85	.....
Republic	1	.11	.10¼	.10½	.09¾	.10¼	.09½	.10½	.09	.10¾	.09	.10¼	.09¼	5,000
Virtue	1	.24	.18	.15	.09	.18	.10	.18	.10	.20	.10	.18	.10	.....
War Eagle Cons	1	.18	.14	.16	.11¼	.18	.11	.19	.15	.16	.12	.18	.15	.....
Winnipeg	1	.05	.03½	.05	.03¾	.04	.03⅝	.05	.04	.05	.04	.05	.04	.....
Wonderful	1	.04	.02½	.04	.....	.04	.02½	.04	.02½	.04¼	.02½	.04	.02½	.....
Develop. Co		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Can. G. F. S	1	.04⅜	.04	.04⅜	.04	.04⅜	.04	.04⅜	.04¼	.04⅜	.04⅜	.04⅜	.04¼	.....

Total sales, 8,37 shares.

CHEMICALS, MINERALS, RARE EARTHS, ETC. CURRENT WHOLESALE PRICES.

	Cust. Meas.	Price.
Abrasives—		
Carborundum, f.o.b. Niagara Falls, Powd., F. FF. FFF..	lb.	$0.08
Grains	"	.10
Corundum, N. C.	"	.07@.10
Chester, Mass.	"	.04½@.05
Barry's Bay, Ont.		.07½@.09½
Crushed Steel, f. o. b. Pittsburg	"	.05½
Emery, Turkish flour, in kegs.	"	.03½
Grains, in kegs.	"	.05@.05½
Naxos flour, in kegs.	"	.03½
Grains, in kegs.	"	.05@.05½
Chester flour, in kegs.	"	.03½
Grains, in kegs.	"	.05@.05½
Peekskill, f.o.b. Easton, Pa., flour, in kegs.	"	.01½
Grains, in kegs.	"	.02½
Crude, ex-ship N. Y.: Abbott (Turkey)	lg. ton	26.50@30.00
Kuluk (Turkey)	"	22.00@24.00
Naxos (Greek) h. gr	"	.26.00
Garnet, as per quality	sh. ton	25.00@35.00
Pumice Stone, Am. powd.	lb.	.01½@.02
Italian, powdered.	"	.01½
Lump, per quality	"	.04@.40
Rottenstone, ground	"	02½@.04½
Lump, per quality	"	.06@.20
Rouge, per quality	"	.10@.30
Steel Emery, f.o.b. Pittsburg..	"	.07
Acids—		
Boracic, crystals	"	.10¾@.11
Powdered	"	.11¼@.11½
Carbonic, liquid gas.		.12½
Chromic, crude		.20
Hydrofluoric, 30%	"	.03
48%	"	.05
60%	"	.11
Sulphurous, liquid anhy.	"	.05
Alcohol—Grain	gal.	2.45
Refined wood, 95@97%	"	.60@.65
Purified	"	1.20@1.50
Alum—Lump	100 lbs.	1.75
Ground	"	1.80
Powdered	"	3.00
Chrome, com'l	"	2.75@3.00
Aluminum—		
Nitrate	lb.	1.50
Oxide, com'l, common	"	.06½
Best	"	.20
Pure	"	.80
Hydrated	100 lbs.	2.60
Sulphate, pure	"	1.50@2.00
Com'l	"	1.15@1.25
Ammonia—		
Aqua, 16°	lb.	.03
18°	"	.03¼
20°	"	.03¾
26°	"	.05½
Ammonium—		
Carbonate, lump	"	.08¼@.08½
Powdered	"	.09@.09¼
Muriate, grain	"	.05⅝
Lump	"	.08⅝
Nitrate, white, pure (99%)	"	.12
Phosphate, com'l.	"	.09
Pure	"	.12
Antimony—Glass	"	.30@.40
Needle, lump	"	.05½@.06
Powdered, ordinary	"	.05¾@.07¼
Oxide, com'l white, 95%	"	.09½
Com'l white, 99%	"	.12
Com'l gray	"	.07
Sulphuret com'l	"	.16
Arsenic—White	"	.03½@.03⅝
Red	"	.06¼@.07
Asphaltum—		
Ventura, Cal.	sh. ton	32.00
Cuban	lb.	.01½@.03½
Egyptian, crude	"	.05½@.06
Trinidad, refined	sh. ton	35.00
San Valentino (Italian)	lg. ton	16.00
Seyssel (French), mastic.	sh. ton	21.00
Gilsonite, Utah, ordinary	lb.	.03
Select	"	.03¾
Barium—		
Carb. Lump, 80@90%	sh. ton	25.00@27.50
92@98%	"	26.00@29.00
Powdered, 80@90%	lb.	.01¾@.02
Chloride, com'l	100 lbs.	1.67½@1.76
Chem. pure cryst	lb.	05
Nitrate, powdered.	"	.05⅛
Barium—		
Oxide, Am. hyd. cryst.	lb.	$0.02¾
Sulphate (Blanc Fixe)	"	.02
Barytes—		
Am. Crude, No. 1	sh. ton	9.00
Crude, No. 2	"	8.00
Crude, No. 3	"	7.75
German, gray	"	14.50
Snow white	"	17.00
Bauxite—Ga. or Ala. mines:		
First grade	lg. ton	5.50
Second grade	"	4.75
Bismuth—Subnitrate	lb.	1.40
Subcarbonate	"	1.65
Bitumen—"B"	"	.03½
"A"	"	.05
Bone Ash	"	.02¼@.02½
Borax	"	.07¼@.07½
Bromine	"	.40
Cadmium—Metallic	"	1.40
Sulphate	100 lbs.	2.00@2.50
Calcium—Acetate, gray	"	1.30
" brown	"	.90
Carbide, ton lots f.o.b. Niagara Falls, N. Y., or Jersey City, N. J.	sh. ton	75.00
Carbonate, ppt.	lb.	.05
Chloride,	sh. ton,	9.00@10.00
Cement—		
Portland, Am., 400 lbs.	bbl.	1.70@1.90
Foreign	"	1.65@2.25
"Rosendale," 300 lbs.	"	.75
Slag cement, imported	"	1.65
Ceresine—		
Orange and Yellow	lb.	.12
White	"	.13½
Chalk—Lump, bulk	sh. ton	2.75
Ppt. per quality	lb.	.03¾@.06
Chlorine—Liquid	"	.30
Water	"	.10
Chrome Ore—		
(50% ch.) ex-ship N. Y.	lg. ton	24.75
Sand, f.o.b. Baltimore	"	33.00
Bricks, f.o.b. Pittsburg	M	175.00
Clay, China—Am. com., ex-dock, N. Y.	lg. ton	8.00
Am. best, ex-dock, N. Y.	"	9.00
English, common	"	12.00
Best grade	"	17.00
Fire Clay, ordinary	sh. ton	4.25
Best	"	6.00
Slip Clay	"	5.00
Coal Tar Pitch	gal.	.08
Cobalt—Carbonate	lb.	1.75
Nitrate	"	1.50
Oxide—Black	"	2.26@2.30
Gray	"	2.28@2.40
Smalt, blue ordinary	"	.06
Best	"	.20
Copperas	100 lbs.	.30@.35
Copper—Carbonate	lb.	.18@.19
Chloride	"	.27
Nitrate, crystals	"	.35
Oxide, com'l.	"	.19
Cryolite	"	.06½
Explosives—		
Blasting powder, A	25 lb. keg	2.65
Blasting powder, B.	"	1.40
"Rackarock," A	lb.	.25
"Rackarock," B	"	.18
Judson R.R. powder	"	.10
Dynamite (20% nitro-glycerine)	"	.13
(30% nitro-glycerine)	"	.14
(40% nitro-glycerine	"	.15
(50% nitro-glycerine)	"	.16½
(60% nitro-glycerine)	"	.18
(75% nitro-glycerine)	"	.21
Glycerine for nitro (32 2-10° Be.)		.12½@.13
Feldspar—Ground	sh. ton	8.00@9.00
Flint Pebbles—Danish, Best.	lg. ton	14.75
French, Best		11.75
Fluorspar—		
Am. lump, 1st grade	sh. ton	$14.40
2d grade	"	13.90
Gravel and crushed, 1st gr.	"	13.40
2d grade	"	12.40
Ground, 1st grade	"	17.90
2d grade	"	16.50
Foreign, lump	"	8.00@12.00
Ground	"	11.50@14.00
Fuller's Earth—Lump	100 lbs.	.75
Powdered	"	.85
Graphite—Am. f.o.b. Providence, R. I., lump	sh. ton	$8.00
Pulverized	"	30.00
German, som. pulv	lb.	.01¼@.01½
Best pulverized	"	.01½@.02
Ceylon, common pulv	"	.02¾@.03½
Best pulverized	"	.04@.08
Italian, pulv	"	.01¼
Gypsum—Ground	sh. ton	8.00@8.50
Fertilizer	"	7.00
Rock	lg. ton	4.00
English and French	"	14.00@16.00
Infusiorial Earth—Ground.		
American, best	"	20.00
French	"	37.50
German	"	40.00
Iodine—Crude	100 lbs	2.45
Iron—Muriate	lb.	.05
Nitrate, com'l	"	.01¼
True	"	.04
Oxide, pure copperas col	"	.05@.10
Purple-brown	"	.02
Venetian red	"	.01@.01½
Scale	"	.01@03
Kaolin—(See Clay, China.)		
Kryolith—(See Cryolite.)		
Lead—Acetate, white	"	.07¾@.08
Brown	"	.06
Nitrate, com'l	"	.06½
" gran	"	.08¼
Lime—Com., abt. 250 lbs.	bbl.	.80
Finishing	"	.90
Magnesite—Greece.		
Crude (95%)	lg. ton	6.50@7.00
Calcined	sh. ton	14.00@15.00
Bricks	M	170.00
Am. Bricks, f.o.b. Pittsburg	"	175.00
Magnesium—		
Carbonate, light, fine pd.	lb.	.05
Blocks	"	.07@.09
Chloride, com'l	"	.01¾
Fused	"	.20
Nitrate	"	.60
Sulphate	100 lbs.	.75@.95
Manganese—Powdered, 70@75% binoxide	lb.	.01¼@.01½
Crude, pow'd. 75@85% binoxide	"	.01½@.02¼
85@90% binoxide	"	.02¼@.03¼
90@95% binoxide	"	.03¼@.05½
Carbonate	"	.16@.20
Chloride	"	.04
Ore, 50%. Foreign	unit	.20@.21
Domestic	"	.30
Marble—Flour	sh. ton	6.00@7.00
Mercury—Bichloride	lb.	.77
Mica—N. Y. gr'nd, coarse	"	.03@.04
Fine	"	.04@.05
Sheets, N. C., 2x4 in.	"	.30
3x3 in	"	.80
3x4 in.	"	1.50
4x4 in.	"	2.00
6x6 in.	"	3.00
Mineral Wool—		
Slag, ordinary	sh. ton	19.00
Selected	"	25.00
Rock, ordinary	"	32.00
Selected	"	40.00
Nickel—Oxide, No. 1	lb.	1.00
No. 2	"	.60
Sulphate	"	.20@.21
Oils—Black, reduced 29 gr.:		
25@30, cold test	gal.	.09¾@.10¼
15, cold test	"	.10¾@.11¼
Zero	"	.11¾@.12¾
Summer	"	.09¼@.09¾
Cylinder, dark steam ref.	"	.08¾@.10¼
Dark, filtered	"	.11¼@.15¾
Light filtered	"	.14¾@.17¾
Extra cold test	"	.21¾@.26¾
Gasoline, 88°@90°	"	.14@.19
Naphtha, crude, 68°@72°	bbl.	9.05
"Stove"	gal.	.12
Linseed, domestic raw	"	.64@.65
Boiled	"	.67
Calcutta, raw	"	.85
Ozokerite	lb.	.11½
Paints and Colors—		
Chrome green, common	"	.05
Pure	"	.16
Yellow, common	"	.10¼
Best	"	25
Lampblack, com'l	"	.04½
Refined	"	.07
Litharge, Am. powd	"	.04¾@.05¼
English flake	"	.08¼@.08½
Glassmakers'	"	.07¼@.08
Paints and Colors—	Cust. Meas.	Price
Metallic, brown	sh. ton	$ 19.00
Red	"	16.00
Ocher, Am. common	"	9.25@10.00
Best	"	21.25@25.00
Dutch, washed	lb.	.04¾
French, washed	"	.01½@.01¾
Orange mineral, Am	"	.07¼@.07½
Foreign, as to make	"	.07¾@.11⅜
Paris green, pure, bulk	"	.12@.12¼
Red lead, American	"	.05¼@.05¾
Foreign	"	.06⅜@.08
Turpentine, spirits	gal.	.45½
White lead, Am., dry	lb.	.04¼@.04½
American, in oil	"	.05¼@.05¾
Foreign, in oil	"	.07½@.09¼
Zinc, white, Am., ex dry	"	.04⅜@.04¾
American, red seal	"	.06½
Green seal	"	.07
Foreign, red seal, dry	"	.05¾@.08½
Green seal, dry	"	.06½@.08½
Potash—		
Caustic, ordinary	"	.04⅞@.06
Elect. (90%)	"	.06½
Potassium—		
Bicarbonate cryst.	"	.08¼
Powdered or gran	"	.14
Bichromate, Am.	"	.08⅛@.08¼
Scotch	"	.08½@.09
Carbonate, hydrated	"	.04@.04¼
Calcined	"	.03½@.03¾
Chromate	"	.35
Cyanide (98@99%)	"	.23
Kainit	lg. ton	9.05
Manure salt, 20%	100 lbs.	.66
Double Manure salt, 48@53%.	"	1.12
Muriate, 80@85%.	"	1.83
95%	"	1.86
Permanganate	lb.	.09¼@.10¼
Prussiate, yellow	"	.13½@.14
Red	"	.36
Sulphate, 90%	100 lbs.	2.11
96%	"	2.14
Sylvinit	unit	.35½
Quartz—(See Silica).		
Salt—N. Y. com. fine	sh. ton	2.00
N. Y. agricultural	"	1.50
Saltpetre—Crude	100 lbs.	3.20@3.37½
Refined	"	4.25@4.62½
Silica—Best foreign	lg. ton	10.00@11.00
Ground quartz, ord.	sh. ton	6.00@8.00
Best	"	12.00@13.00
Lump quartz	"	2.50@4.00
Glass sand	"	2.75
Silver—Chloride	oz.	65
Nitrate	"	35
Oxide	"	85.@1.10
Sodium—		
Bichromate	lb.	.06¼
Chlorate, com'l	"	.07⅞@.08½
Hyposulphite, Am.	100 lbs.	1.60@1.65
German	"	1.70@1.90
Peroxide	lb.	.45
Phosphate	"	.02½@.03
Prussiate	"	.10½@.11
Silicate, conc	"	.05
Com'l	"	.01
Sulphate, com'l	100 lb.	.77½
Sulphide	lb.	.01¼
Sulphite crystals	"	.02½
Sulphur—Roll	100 lbs.	1.85
Flour	"	1.90
Flowers, sublimed	"	2.15
Talc—N. C., 1st grade	sh. ton	13.75
N. Y., Fibrous, best	"	10.20
French, best	100 lbs.	1.25
Italian, best	"	1.62½
Tar—Regular	bbl.	1.85
Oil barrels	"	3.65
Tin—Crystals	lb.	.20
Oxide	"	.42
Uranium—Oxide	"	2.25@3.00
Zinc—Metallic, ch. pure	"	.07@.07¾
Carbonate, ppt.	"	.09
Chloride	"	.05
Dust	"	.05½@.05¾
Sulphate	"	.02⅛@.02½

THE RARE EARTHS.

	Cust. Meas.	Price
Boron—Nitrate	lb.	$1.50
Calcium—Tungstate (Scheelite),	"	.60
Cerium—Nitrate	"	10.00
Didymium—Nitrate	"	35.00
Erbium—Nitrate	"	40.00
Glucinum—Nitrate	"	20.00
Lanthanum—Nitrate	"	30.00
Lithium—Nitrate	oz.	.60
Strontium—Nitrate	lb.	06¾@.07
Thorium—Nitrate 49@50%	"	4.50
Uranium—Nitrate	oz.	.25
Yttrium—Nitrate	lb.	40.00
Zirconium—Nitrate	"	8.00

NOTE.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable. See also Market Reviews.